Indian Farming

MARCH 1959

The end of the world

'THAT,' thought the hare, 'must surely be the Earth crumbling to pieces.' He had heard the thud of a fruit falling on dry leaves. 'I must run to save my life,' he mused.

He ran so fast that a deer, grazing in the fields, asked him, 'Why all this haste, brother?'

'Don't you know that the Earth is falling apart?' panted the hare. 'Save yourself! Follow me!'

The deer raced after him.

And soon they were joined by a buffalo, a wild ox, a rhinoceros, a tiger, an elephant and even a lion. In fact, the whole animal world followed them in a great procession.

They thundered on for miles and miles—until they were tired. Then the elephant began to wonder why there were no more signs of the Earth's collapse. So he asked the tiger: 'Brother Tiger, are you sure that the Earth is breaking up?'

The tiger stopped. 'Well, so the rhinoceros informs me,' he said.

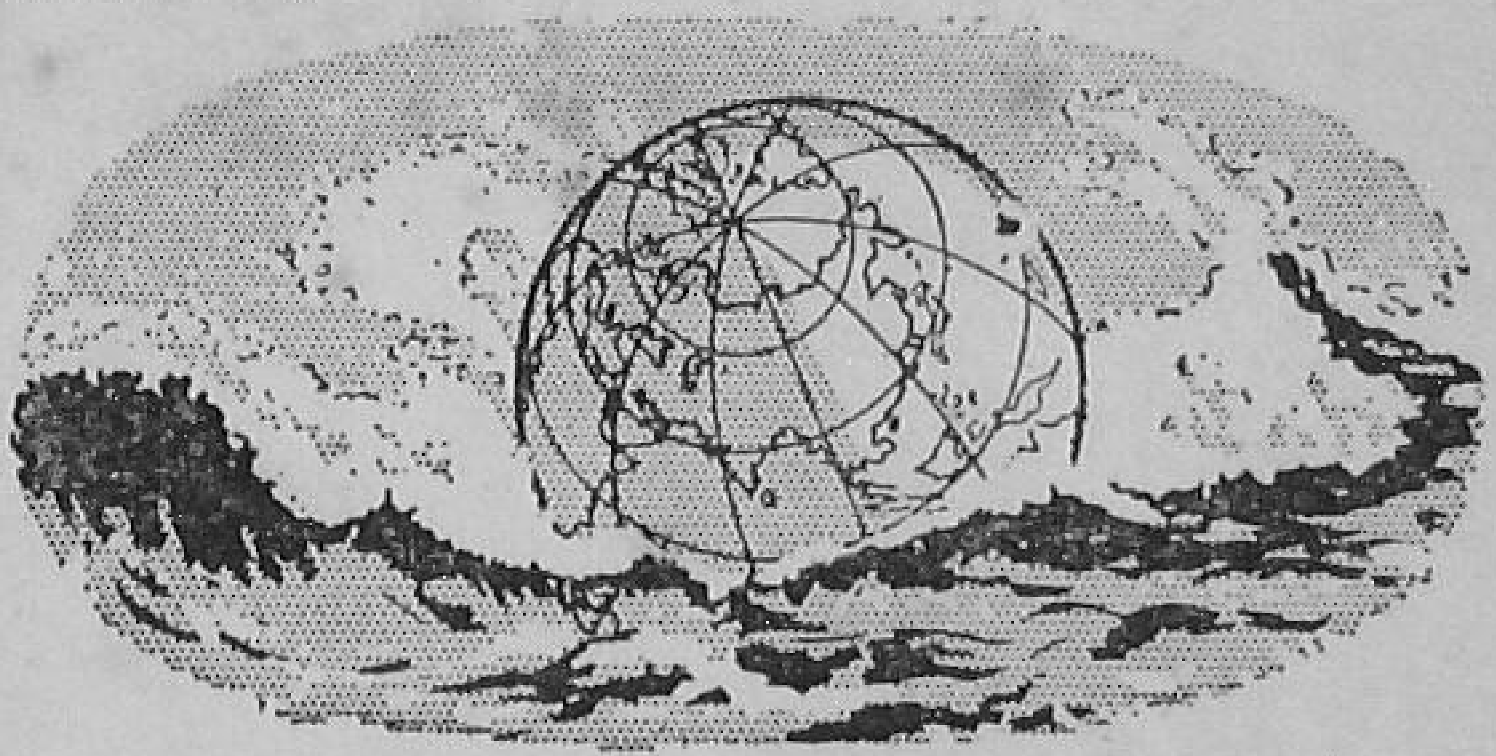
'I'm not sure,' cried the rhinoceros. 'Only, the wild ox tells me so.'

The wild ox bellowed: 'Don't blame me! I only repeat what the buffalo said.'

The buffalo pointed to the deer; and the deer mumbled: 'The hare started the story.'

The elephant trumpeted for the hare and asked: 'Well, Mr. Hare, who told you that the Earth was collapsing?'

'Nobody need tell *me*,' said the hare importantly. 'I knew as soon as I heard a sound like a thud. I thought it was certainly the end of the world.'



'You *thought* so,' laughed the elephant. And all the other animals went off, roaring with laughter.

MORAL of the story: Never listen to rumours when the facts are available and known. Consider DALDA. What are the true facts? It is an all-purpose cooking medium, made from pure vegetable oils—according to strict Government specifications.

For extra nourishment, 700 International Units of Vitamin A are added to every ounce plus 56 International Units of Vitamin D. Millions of housewives cook with DALDA Vanaspati because they know it is more than a cooking medium—that it's a *food*!

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21 MAR 1959

MARCH 1959

Vol. VIII No. 12

Indian Farming

OUR COVER

Well-timed, adequate irrigations no doubt are a great aid in stepping up wheat yields, but only so long as the soil has enough nutrients for the crop. For best results, they need to be combined with a good supply of nitrogenous and phosphatic fertilizers

Photo by H. K. Gorkha

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Editor: **Harkirat Singh**

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NEW DELHI

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Grandpa always told me it was impolite to ask questions (*said Tata*).

But to find something out (*said Fison*) one has to be a bit nosey!

What we want to find out from you is what sort of pesticides you need (*said Tata*)—and how we can make our present products better.

So if we make it our business to ask a few questions (*said Fison*), don't think us rude...

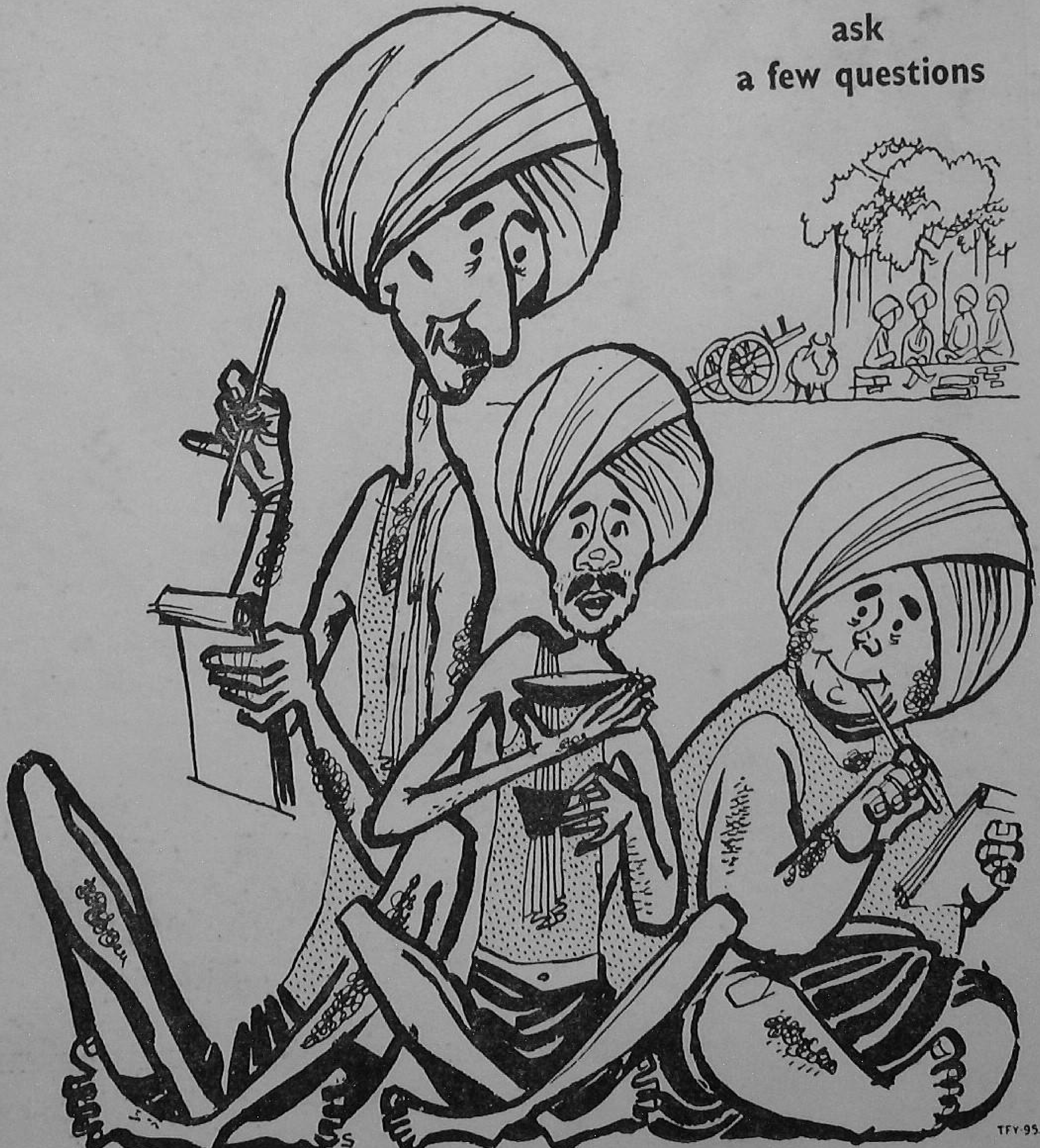
It's all in your own interest (*said Tata*).

And ours too, of course!

P.S. *The science of asking questions is Market Research, and it has solved many consumer problems. It could tell you, for instance, why gentlemen prefer blondes or why blondes prefer gentlemen—if you're interested in that sort of thing! Tata-Fison, the largest formulators and distributors of pesticides in India, believe very strongly in Market Research. Can't do enough of it (they say).*

TATA-FISON *a solution for every pest*

TATA-FISON
ask a few questions



TFY-95

MIXED FARMING

THERE should be no two opinions about the fact that the mixed farming system suits our small holdings best. Mixed farming, as understood in India, is a complementary use of livestock and crops to get the maximum out of both. Its ultimate aim is a self-sufficient unit where all the primary needs of the rural family will be met. This is achieved by growing food and cash crops, rearing dairy stock over and above the work-animals, introducing suitable forage crops in the cropping scheme and making an optimal use of cattle manure and other farm wastes.

The advantages are quite clear: an intensive use of the land is made; the fertility of the land improves due to the growing of leguminous and other fodders and the extra manure obtained from the cattle; by-products of crops and the natural growth of local grasses during the monsoon months are profitably utilized by animals; the milch cattle not only provide a wholesome diet to the family but also supplement its income; the farmer can have animals from his milch stock for cultivation without investing any capital from his pocket; the dry stock is not a burden. To ensure a full use of the entire farmyard manure, fuel and fodder trees such as *babul* and *shisham* may be grown on the sides of the roads, field boundaries, etc.

Mixed farming, in fact, is not something new to our farmer. But, he practises it merely as a tradition handed down to him by his ancestors. To enjoy the benefits of mixed farming to the maximum extent, however, he has to develop a strictly business outlook. If he maintains cows which have long dry periods and do not yield much of milk, for sentimental reasons, he is losing sight of economic considerations. The mere manure from them cannot pay for their upkeep.

That is why prosperous "mixed" farmers attribute their success to: keeping only as many animals as can be conveniently maintained without the need to purchase food and fodder from the market, selecting a more economic animal, purchasing a bullock rather than rearing one if it is uneconomic to do so and disposing of calves immediately after the weaning stage, feeding the animals in stalls except in the three monsoon months to get every bit of manure from them, disposing of the animals before they get too old, and sending bullocks to *pinjrapoles* and paying the necessary fees instead of feeding them at home.

The economy of a mixed farming unit may be further reinforced by maintaining sheep, goats, pigs and poultry. Where water reservoirs, tanks or ponds are available on the farm, fish rearing may be practised. The spare time of the members of the household will thus be profitably spent, and in times of stress the subsidiary occupations will stand in good stead to the family.

A crop of *N. P. 822* wheat that promises a big harvest

42 Maunds of Wheat Where One Grew Before

by

Harkirat Singh

TAKING crops out of an "unwilling" land may be a difficult task for an ordinary farmer, but not for Shri Kesar Singh ; he is slowly making some 27 "poor" acres bear "rich" crops for him. Shri Kesar Singh, whose farm I visited last month, belongs to the Garden Colony of Panchi Gujran in Rohtak district of the Punjab. This land has been allotted to him in lieu of ancestral property left by him in West Pakistan.

Not that Shri Kesar Singh has been a farmer throughout his life. He took to this "interesting vocation," as he calls it, only after retirement from Government service. There was disappointment in store for him though when his first attempt in 1950 brought him a mixed wheat-gram yield of a maund and ten seers only.

This, however, did not damp his ardour. He resolved to discover and remove the cause of this low yield. He got his soil analysed by the Government Soil Chemist, "and his report," Shri Kesar Singh beamed, "was what actually showed me the way." It read: "The soil ....seems to be a poor one. The *ph* being more than 8.0, the soil shows a tendency towards alkalinity. The

essential plant-food ingredients are lacking. There being no *kankar*, etc. throughout, the soil can be improved and kept fit by a regular and copious supply of water, organic matter, nitrogenous and phosphatic fertilizers. Green manuring if resorted to will have great beneficial effect towards binding the soil."

PRACTICAL PLAN

Keeping these points in view, he soon set about drawing up a practical plan for his next wheat crop. "I gathered a good deal of agricultural literature, and also contacted agricultural officials," Shri Kesar Singh told me. This is the programme he finally worked out: first of all, drilling superphosphate at a maund to the acre; then sowing *guara* and burying it when three to four feet high; then giving the land three to four ploughings, an equal number of *sohagas* and the *rauni* irrigation; then drilling a maund of superphosphate and a maund of ammonium sulphate to the acre; then drilling wheat in lines by using a seed-rate of a maund per acre; irrigations depending upon the need of the crop, generally four; one hoeing after the first watering.

Success came, and the yield began increasing from year to year. In 1957, it stood at 42 maunds 22 seers per acre!

CERTAIN CHANGES

Now when the land has "got into the habit of giving good yields" he has made certain alterations in his method a maund of superphosphate at the time of burying the *guara* and not at the time of sowing it; 20 seers of superphosphate and 20 seers of calcium nitrate at the first watering; 20 to 30 seers of calcium nitrate again at flowering "if the crop does not seem to be coming up to my expectations."

Shri Kesar Singh grows only *N.P.* wheats. "My farm being nearer to Delhi, they seem to do specially well here," he is of the opinion. As soon as he notices any deficiency in a variety, he at once changes to a better one. While he has also grown *N.P. 718*, *N.P. 760* and *N.P. 770*, these days he prefers *N.P. 822* and *N.P. 824*. "These are comparatively better-yielding, and non-lodging."

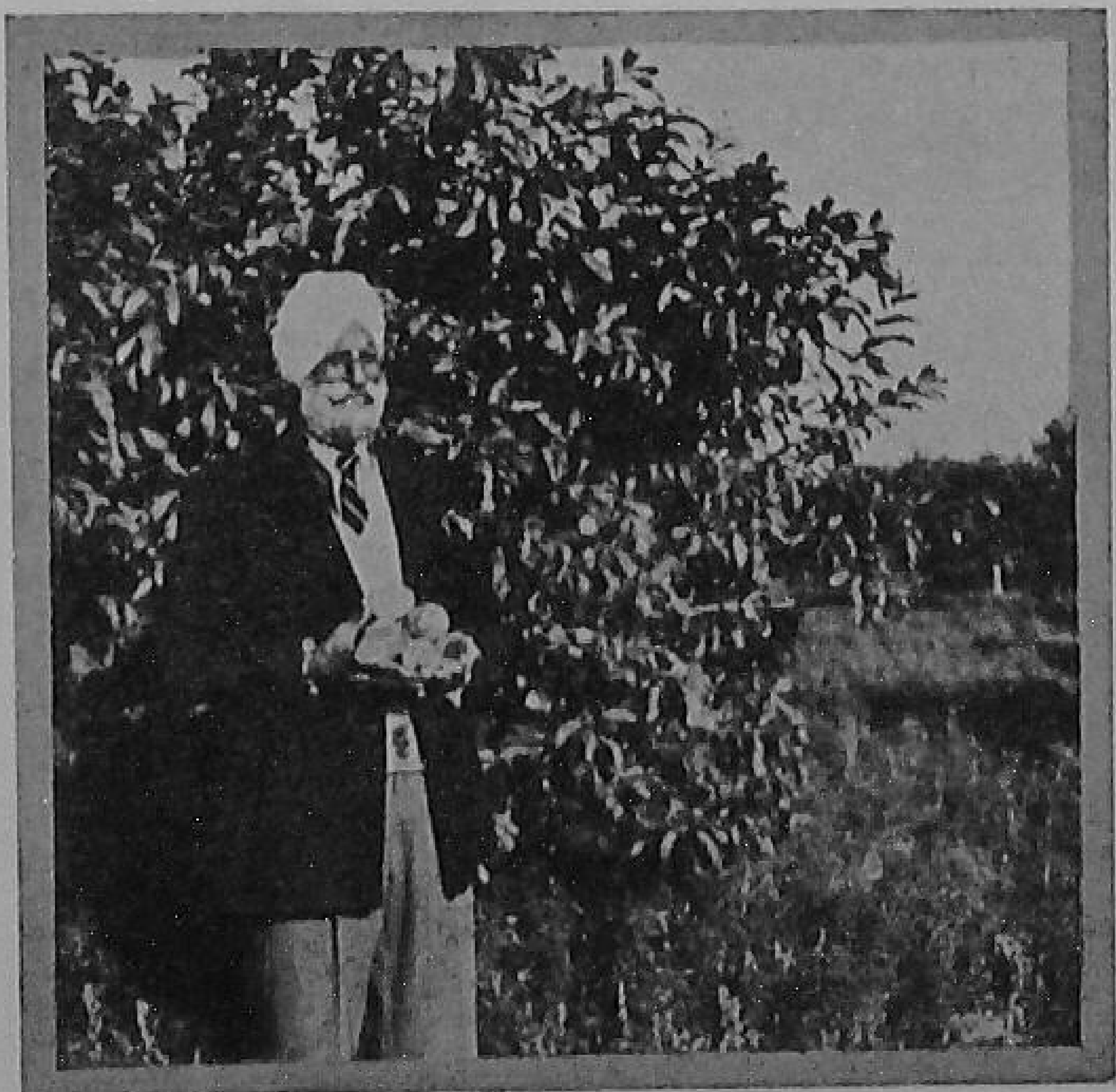
GUAVA ORCHARD

Since the Colony is primarily meant to be a Garden Colony, Shri Kesar Singh has set apart 13 acres for fruit trees. About 500 guava trees have come up well and 200 of them bore fruit for the first time this year after three years of planting; peaches, grapes and citrus are in his plan.

"Guavas are particularly suited for my soil," thinks Shri Kesar Singh. He, therefore, pays good attention to his guava orchard and wants to make it a lucrative proposition. He has decided to take only one heavy crop in winter, so he does not water the trees in March, April and May. "To conserve their vigour for the fruiting time," he will tell you. At the end of June, he gives each guava tree a maund of cattle manure plus a pound of ammonium sulphate or calcium nitrate.

Shri Kesar Singh also has a passion for poultry-keeping. His 97-strong White Leghorn flock is very

In his guava orchard



Son Rajwant Singh is a great help in looking after the poultry

Shri Kesar Singh attributes his success in green manuring to two implements he possesses: the "Caretake" plough (*left*) and the green manure trampler (*right*)

well kept, and his 88 layers easily give him a daily egg-laying percentage of 40 to 45. A Light Sussex cock bred by him won the First Prize at the All-India Cattle and Poultry Show held in Delhi last year. "It all depends on the attention you give them," he says.

That the farmer would not waste any possible manure he could lay his hands upon was evident to me when he revealed that he would construct his new poultry cages over a portion of the irrigation channel near his tube-well. "Not only the birds will thus have cool comfort, but also their droppings will fall into the irrigation water and enrich my fields," he said.

Shri Kesar Singh also proposes to make use of a natural depression in his land by shaping it into a pond for rearing fish.

PLEASING FEATURE

A very pleasing feature of the Kesar Singh Farm is its rose hedges around the field borders—a total length of 2,600 feet. The variety used is *Bahari* from Choha Saidan Shah in West Pakistan. Apart from its being very thorny, another advantage of this variety is that the plants grow very tall and entangle themselves into an impenetrable wall.

"In April when they are in full bloom, my farm looks like a land of roses and the whole air is filled with sweet fragrance," Shri Kesar Singh tried to recreate the vision he is a witness to every year. "And since the flowering is very heavy and lasts for about 15 days only, I am thinking of utilizing the flowers, which are otherwise wasted, for distilling scent from them," he added.

The idea has caught on in the Colony and almost all the fields now have rose borders. Shri Kesar Singh was amused at my suggestion that they name it "Gulab Colony."

FIFTH NATIONAL CONVENTION OF FARMERS

Mysore will be the venue of the Fifth National Convention of Farmers to be held this year from May 1 to 5. It is expected that the Convention will be attended by over 3,000 farmer representatives from all parts of the country.

An Agriculture and Rural Industries Exhibition in which the various State Departments of Agriculture and other Committees and Organizations will participate, will also be held on the occasion. The Exhibition will depict the latest advances in agriculture in the country.

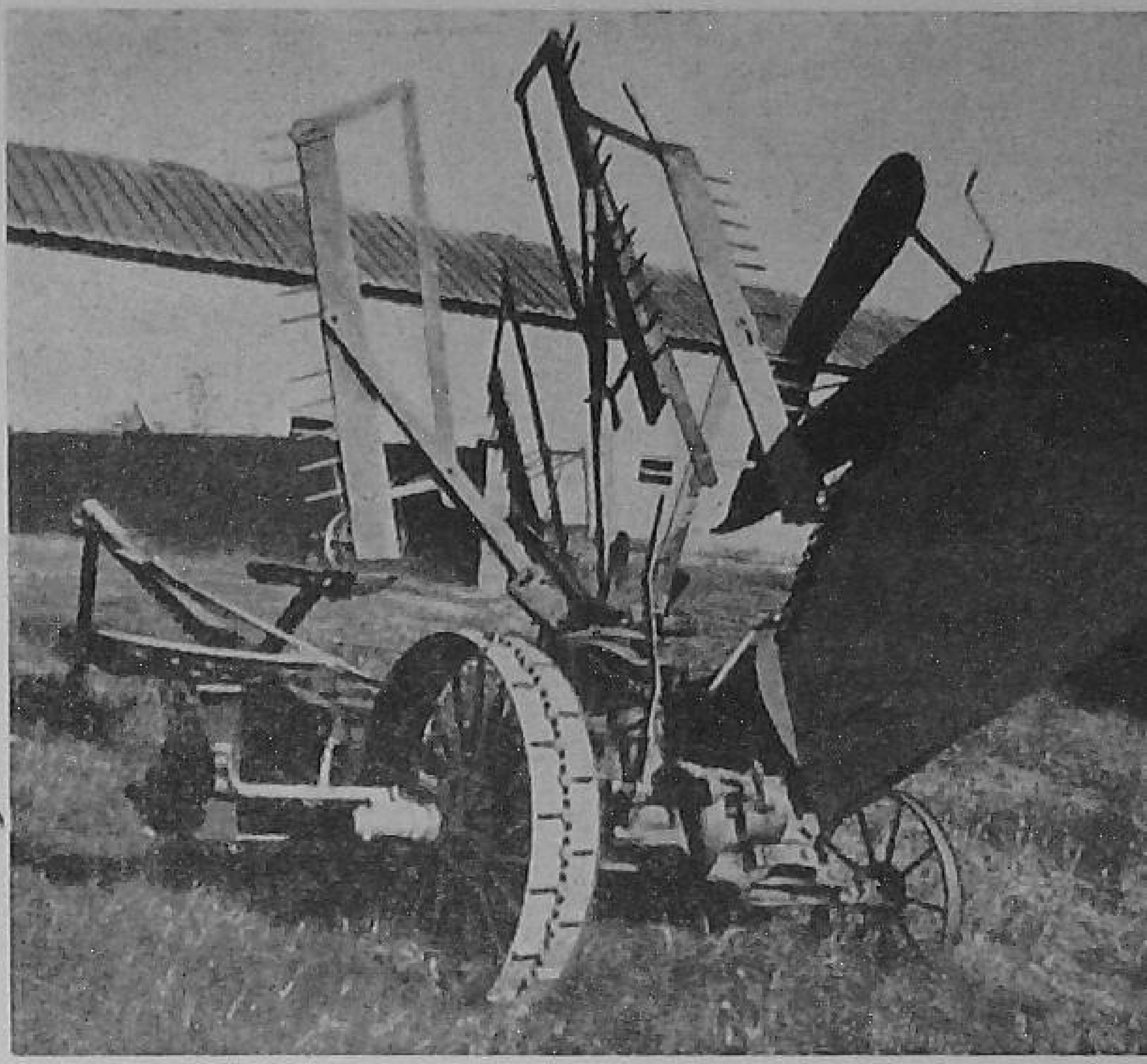
For further information please contact the Secretary, Farmers' Forum, India, Jawahar Lal Mansion, 3/15A, Ajmeri Gate Extension, New Delhi-1.

Two Reapers That Cut On Harvesting Costs

by

T. S. Mukherjee

Indian Agricultural Research Institute
New Delhi



Better of the two is this self-delivery reaping machine. The platform has been raised and it is ready to be hauled to the field

IT has been found at the Indian Agricultural Research Institute, New Delhi, that for quick and economic harvesting of grain crops the horse-drawn reaping machines used in comparatively less mechanized countries can be conveniently adapted to our bullock-power.

One such machine is the bullock-drawn mowing machine used for cutting legumes and grasses. This machine has a 4½-foot cutter-bar. The machine has been slightly modified by fixing immediately behind the cutter-bar a buncher attachment made of wooden slats. This attachment has a hand-lever to raise or lower one end of it to collect the cut plants and deposit them in the field at intervals.

The bullock-drawn mowing machine in action in a wheat field

With this machine, an acre of wheat can be harvested in 23·50 man-hours, in addition to 3·60 bullock-hours and 1·80 machine-hours. It was observed that it took five hours and 20 minutes for ten men, or 53 man-hours, to harvest the same area by the ordinary Indian sickle.

The main disadvantage of the machine, however, is that it requires a fairly large number of labourers at one time during the field operations. Of the 13 labourers engaged, three drive the machine and the buncher attachment, and the rest remove the cut plants to a side. This is necessary to prevent the harvested plants from getting trampled over by the bullocks in their next round. The same difficulty arises when a reaping attachment is used with a tractor. Such an attachment has another disadvantage: it cannot be conveniently used in small holdings.

SELF-DELIVERY REAPER

Better results were however obtained with a bullock-drawn, self-delivery reaping machine with a five-foot cutter-bar. This machine has a quarter-circle platform or collecting-board of steel plate; the cutter-bar is attached to its front. The harvested plants fall on to this platform and are swept off in heaps by the four rotating 'rakes' or 'sails'. They are deposited at a safe distance from the bullock-track, so the necessity of engaging labourers is eliminated. With a pair of bullocks and two men

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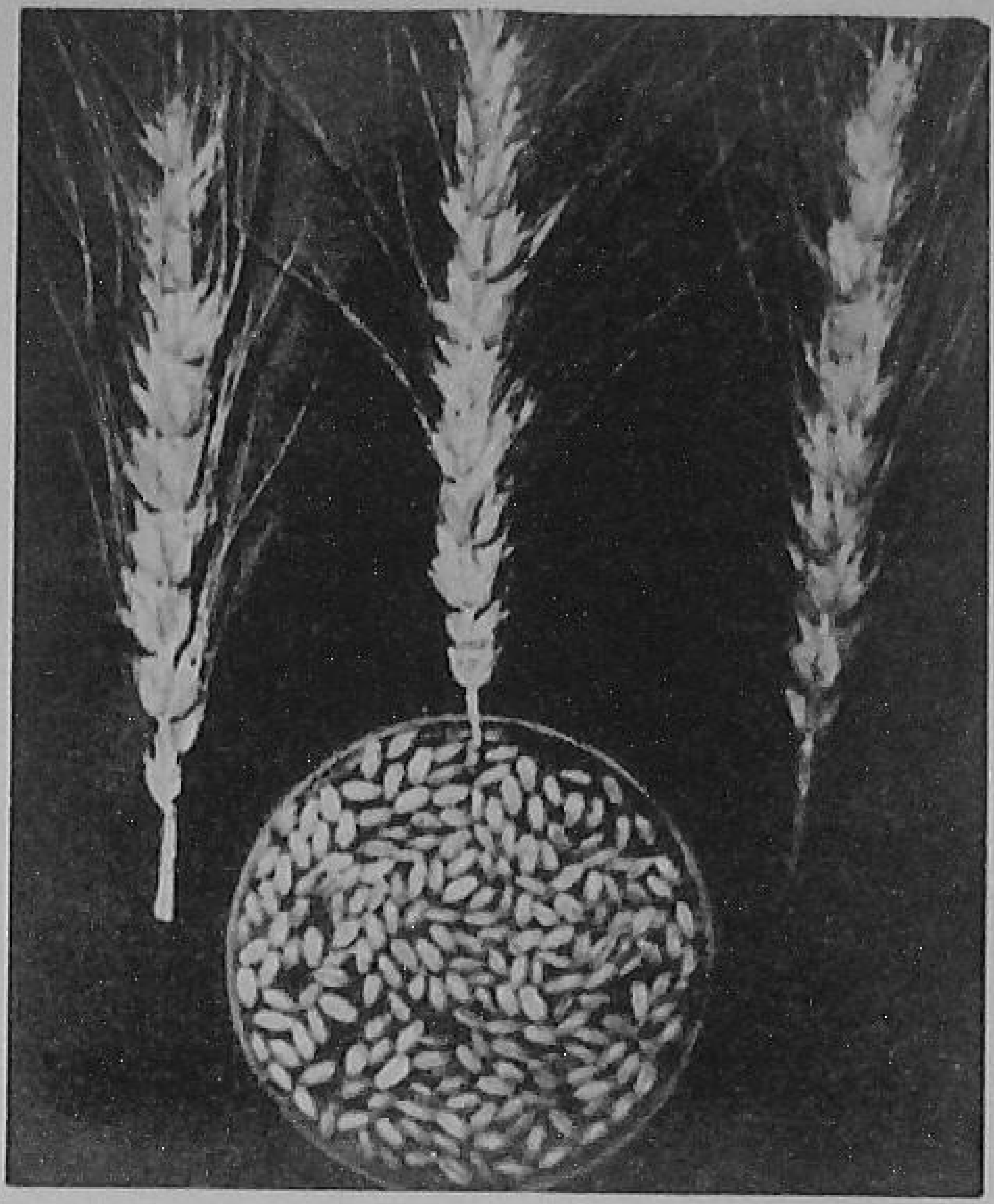

Apart from being earlier in maturity, *C. 281 (right)* has larger earheads, bolder grains than *C. 591 (left)*

C. 281 Scores Over C. 591

by

Gurcharan Singh
Economic Botanist Cereals and Pulses, Punjab Jullundur

and

Narsingh Dass Gupta
Incharge, Barley Research Farm Gurgaon

A NEW strain, *C.281*, promises to solve the problem of low wheat yields in the Hissar, Gurgaon, Rohtak and Karnal districts of the Punjab.

This tract has about 25 per cent of the total wheat area in the State. The crop, however, is grown under conditions such as: meagre irrigation water, dry winter months, early warming up of the season, and fast and desiccating winds in March and April. *C.591* is the recommended variety for growing under irrigated conditions. This variety being mid-season in maturity, its grains do not get a chance to develop fully, shrivel up, and the yields remain low. That is why the necessity for breeding a strain which would mature earlier and escape these unfavourable conditions was felt.

A number of crosses between *C.591* and several early-ripening strains were attempted when the Regional Cereal Breeding Substation was started at Gurgaon in 1940. Of all the crosses obtained, *C.281*, a cross between *C.591* and *Pusa 4*, was found to be the most suitable.

C.281 possesses an erect and upright habit of growth, and at maturity is conspicuous by its slightly drooping earheads. It matures about a fortnight earlier than *C.591* if sown in the third or fourth week of October, which is the normal sowing time of wheat in these districts, and has bolder grains. In trials at many Government Farms for seven to eight years, *C.281* has outyielded *C.591* by an average 1.85 maunds per acre under normal-sown irrigated conditions.

Even under late-sown irrigated conditions, *C.281* has given a higher yield than *C.228*, so far recommended for such conditions, by an average 1.70 maunds per acre. This again goes in favour of *C.281*, as the farmer can utilize this variety both for normal and late sowings and

need not stock seeds of two varieties. This also saves a lot of confusion at sowing, harvesting and threshing.

C.281 has performed equally well on farmers' fields also. Extensive trials of this variety against *C.591* were undertaken in *chahi*, wet, and canal-irrigated areas of these districts. Of the 246 trials conducted in 1951-52, 1953-54 and 1954-55, *C.281* outyielded *C.591* in 173 trials by an average 0.10 to 3.50 maunds of grain per acre. However, the increase in yield of *C.281* over *C.591* during 1953-54 was comparatively less than in 1951-52 and 1954-55. This, because the season during 1953-54 remained unusually mild for a fairly long period, on which account *C.591* was at an advantage and the early-maturing character of *C.281* could not express itself. However, the combined results obtained during all the three years go in favour of *C.281* and are in close conformity with those obtained at Departmental Farms.

A crop of *C.281* nearing maturity. Note the slightly drooping earheads

* * * * *

TOO MUCH MILK IN JAPAN

Japan has a headache: surplus milk production. It figures 1958 production will hit 3.5 billion pounds, an all-time high and 17 per cent above last year.

Since the end of World War II, Japanese milk production has been increasing 16 to 20 per cent every year. While consumption also has increased, it has not kept pace with production. The Government is expected to soon launch a programme to discourage further production increase and to discourage dairy product imports.

—*World Farm News*

'SULPHAMEZATHINE'

5 GM. TABLETS

INFECTION of the cow's womb is common particularly when the delivery is difficult and manual removal of the calf is necessary. If this infection is neglected your cow may become sterile and bear no more calves. This means no more milk and the cow becomes a burden.

THIS loss can be prevented by inserting one or two 5 Gm. tablets of 'Sulphamezathine' into the cow's womb immediately after the calf is born. This keeps the womb clean and free from infection and protects your cow's health.

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Early planting and a good leaf-mulch

ENSURE TWO-FOLD GINGER YIELDS

by

K. Fazlullah Khan

Cashewnut and Spices Development Officer
Indian Council of Agricultural Research

A fine bunch of ginger rhizomes

BY paying attention to two things, farmers can easily double their ginger yields. They are: planting early in the planting season and applying a leaf-mulch to the beds. This is what results achieved under the Ginger Research Scheme at Wyanad go to show.

Ginger is a very remunerative crop, provided it does not suffer seriously from pests and diseases or adverse market developments. The grower quite realizes this and is generally inclined to take to ginger cultivation. But the one factor which deters him is the high cost involved. This also should no more be a problem to him, for he can now increase his ginger yields considerably.

Planting of ginger on the West Coast commences a little before the onset of the South-west Monsoon, which sets in in early May. Usually, the planting continues till the end of June. To determine the optimum time for planting ginger, four different plantings were done on 15th April, 1st May, 15th May and 1st June. The crop planted on 15th April recorded the maximum yield, double that obtained from the crop planted on 1st June.

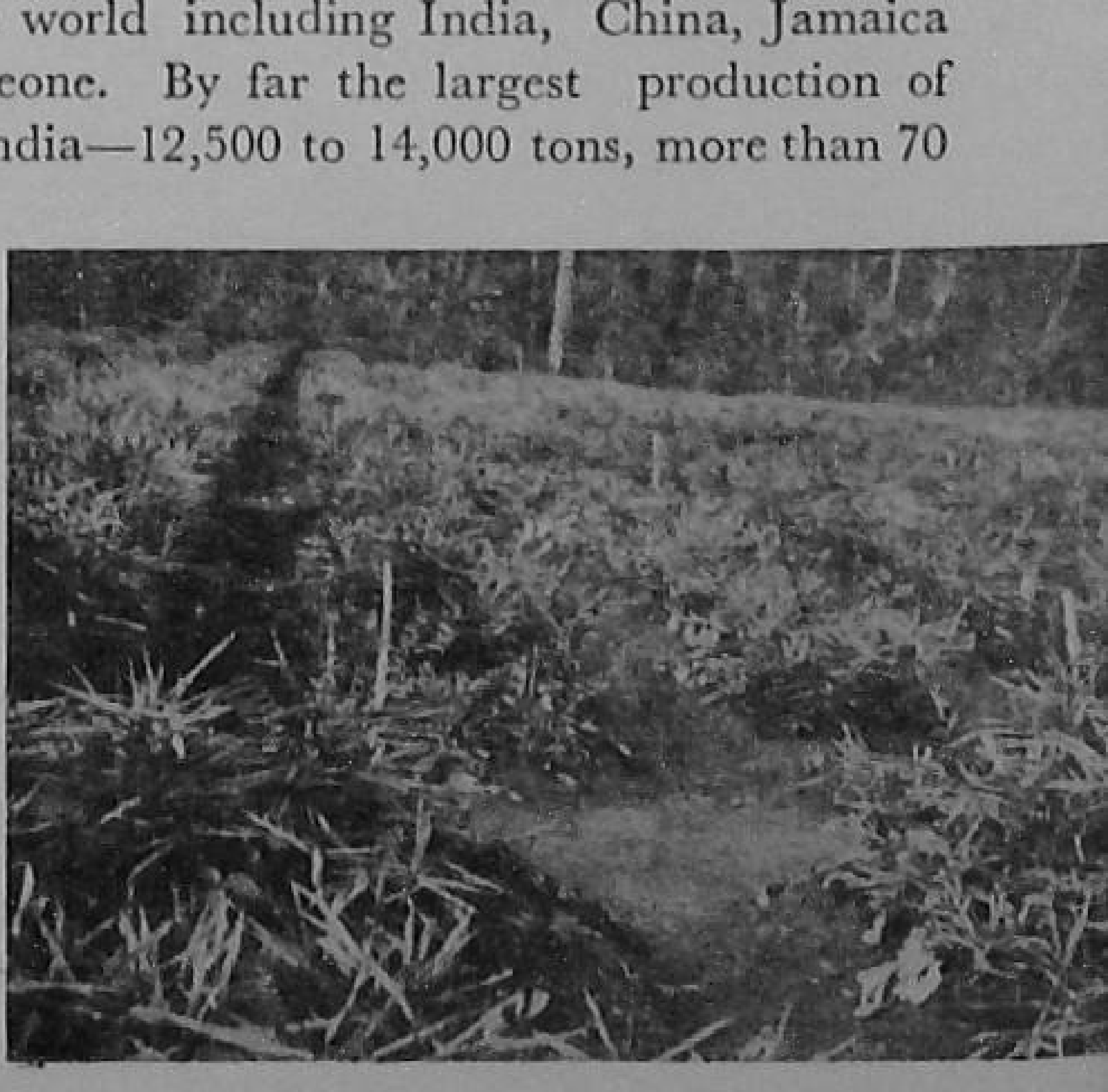
Mulching of the ginger beds with green leaf is common in many parts of Kerala and Mysore States, particularly in areas where leaves can be readily procured. In the trials, application of green leaf at 20,000 pounds per acre was found to enhance the yield by 233 per cent.

THREE DOSES

The mulch was applied in three equal instalments. The first, immediately after planting the seed rhizomes in April, followed by the second and third applications timed according to the absorption of the first mulch. The rotting of the mulch and its absorption into the soil depends on several factors—rain, nature of the leaf and the texture of the soil. Usually, the mulch has to be renewed once in 45 days under Wyanad conditions. The mulch not only protects the young rhizome pieces from the beat of the rain and the intensity of the sun, but also serves to even out the soil temperature and soil moisture. The disintegrated vegetative matter improves the soil tilth and its fertility.

Since ginger is invariably planted in well-drained open soils, mulching also benefits the following crop. There is evidence to show that *ragi*, vegetables, dry paddy, etc., which very often follow the ginger crop in a rotation, thrive even without any extra manuring.

Ginger is produced in many tropical and subtropical regions of the world including India, China, Jamaica and Sierra Leone. By far the largest production of ginger is in India—12,500 to 14,000 tons, more than 70



This ginger crop is growing well because it received adequate mulching

per cent of the world's production. This is largely exported to the Middle East countries, which show a preference for the Indian product.

In India, ginger cultivation is mostly confined to the West Coast of the South Indian peninsula, but it is grown on a smaller scale in West Bengal and the Himalayan regions also. The well-known centres of ginger production on the West Coast are the Moovattupuzha and Thodupuzha divisions and the Ernad and Ponnani taluks of Kerala State. Of late, ginger cultivation has spread to the Wyanad taluk of Kerala State and the Gudalur taluk of Madras State. Kerala alone grows about 26,000 acres with ginger, which is nearly 60 per cent of the total area in the country. In these areas, it is cultivated primarily as a pure crop under rain-fed conditions; in certain other areas in the plains, it is raised under irrigated conditions mixed with other crops.

On account of its high fibre-content, the Indian product is considered unsuitable for preservation. This is one of the major causes why the demand for Indian ginger is declining in the U.K., the U.S.A. and Australia. There is, therefore, immediate need to develop superior varieties to meet the demand of the foreign market. If varieties with lesser fibre were brought under cultivation, they would help develop a sizable export trade in this commodity.

Keeping this in view, ten different ginger varieties were tried at Wyanad. Of these, the introduction from West Bengal, known as the Burdwan variety, recorded the maximum yield of 13 times the quantity of seed used, while the Kerala variety from Ernad recorded a ninefold yield. The exotic variety from Brazil excelled all other varieties in rhizome size, but its total yield amounted only to eight times the seed-rate. In fibre-content, the Ernad ginger stood foremost, recording only 4.29 per cent of fibre as compared to 6.21 per cent of the variety obtained from Mysore State (Karkal).

Some exotic gingers under test at the Ginger Research Station, Wynad

CONTD. FROM PAGE 7

Two Reapers

to drive the machine, an acre can be harvested in an hour.

The cutting mechanisms of the self-delivery bullock-reaper and the mower work on the same principle. A large travelling-wheel supplies the drive and also carries most of the weight of the machine. With a little experience, the village artisan is able to maintain them.

Shown below is the operational efficiency of the sickle and the bullock-drawn harvesting machines.

	Man-hours	*Machine-hours*	*Animal-hours*
Sickle	53.00	—	—
Bullock-drawn mower with buncher attachment	23.50	1.80	3.60
Bullock-drawn self-delivery reaper	2.00	1.00	2.00

However, there is a limitation in the use of these machines. It is necessary to have sufficient grain crops to harvest to keep them fully engaged for at least 20 to 25 days in a year. Otherwise they will not be economical to own.

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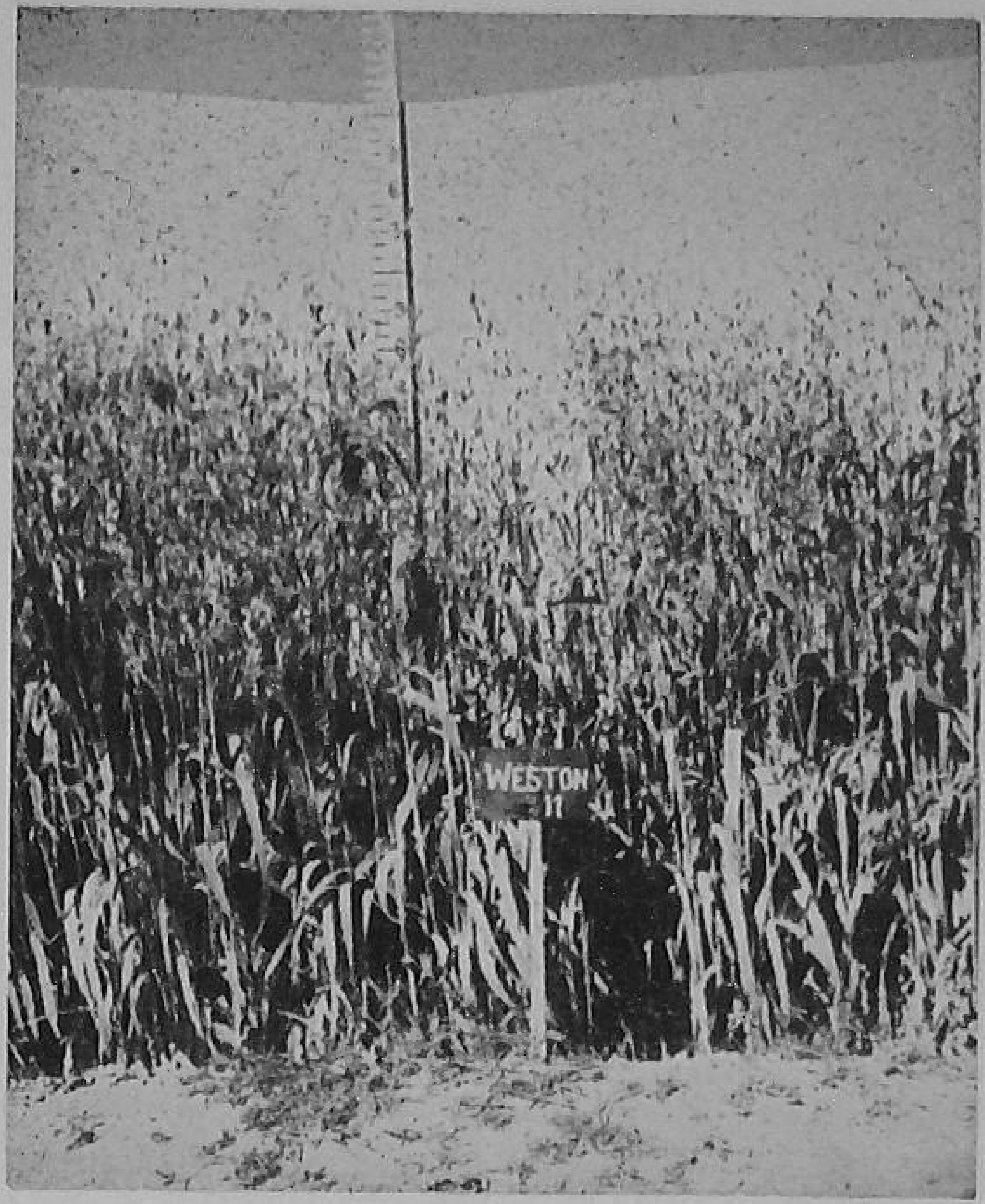
The Way to Higher Yields With Oats

by
H. C. Malik
A. Economic Botanist
Sirsa

A THREE-YEAR experiment at the Sirsa Fodder Research Station has shown the way to higher yields with oats: they must be grown after a legume only. If, however, they are to follow a non-legume, the crop should be adequately fertilized.

Oats is a highly sustaining forage crop of the winter season. It is even preferred to berseem under moisture-shortage conditions. It needs a fertile soil to grow, and responds well to fertilizer. Being a non-legume, it makes a poor growth immediately after another non-legume, but grows well after a legume.

In the experiments at the Sirsa Station, oats were sown immediately after sorghum (non-legume) raised for grain, as well as after lucerne (legume) raised for forage, with and without fertilizer. The fertilizer treatments given were: nitrogen 25 and 40 pounds per acre, and nitrogen 40 pounds plus phosphoric acid 25 pounds per acre—nitrogen in the form of ammonium sulphate and phosphoric acid as superphosphate.



Oats grown after a legume

The crop after sorghum (*jowar* or Sudan grass) was invariably pale and stunted in growth, and that after lucerne, dark green and luxuriant. The fertilizer had a remarkable effect in the former case and practically no effect in the latter.

In the matter of grain and straw yields, oats after lucerne gave double the grain yield compared to oats after sorghum. The yield increase with fertilizer in the case of oats after lucerne was insignificant—26.96 maunds with 25 pounds nitrogen per acre compared to 25.70 maunds without fertilizer. There was no increase in yield with 40 pounds nitrogen, or 40 pounds nitrogen plus 25 pounds phosphoric acid. A straw yield of 80 maunds per acre, almost four times that of 21 and 19 maunds given by oats after *jowar* and Sudan grass, respectively, was obtained when oats followed lucerne; this was without fertilizer. Fertilizer application could increase the straw yield from 34 to 52 maunds per acre only.

ISI STANDARD ON FAT IN MILK

The Gerber method is widely used in India for the rapid determination of fat in milk and milk products, when a large number of samples are to be analysed at a time. The method depends on the liberation of the fat by the action of sulphuric acid or milk or milk products in specially shaped, calibrated glass containers, called butyrometers, which are then centrifuged to aid separation of fat, the volume of which is finally read off against the percentage scale etched on the butyrometer.

With the increasing application of the Gerber method for determination of fat in the milk and milk products for commercial need in India, it had become necessary to prescribe a uniform method, using standard apparatus designed to meet the Indian conditions, so that the results, obtained in different laboratories and by different workers, are comparable. With this end in view, the Indian Standards Institution has published a Specification for Determination of Fat in Whole Milk, Evaporated (Unsweetened) Milk, Separated Milk, Skim Milk, Buttermilk and Cream by the Gerber Method (IS: 1224-1958).

Copies of the standard, published in English and priced at Rs. 1.50 each, are available from the offices of the Indian Standards Institution, located at New Delhi, Bombay, Calcutta and Madras.

Ready for harvest is this crop of *BR 34* paddy

If you are raising an early *aman* paddy

BE SURE YOU GROW *BR 34*

by

S. Nezamuddin
Agronomist, Bihar

and

J.S. Flora
Agricultural Research Institute, Sabour

BIHAR farmers can now take paddy production in the State 20 per cent higher just by changing over to *BR 34*—the new early *aman* variety evolved by the State Agriculture Department. By growing this variety, they would gain an additional 50 rupees per acre.

The salient features of *BR 34* (or *2206B*) are profuse tillering, heavy grains and well-filled earheads. It is a selection from the local *Dolangi* of Monghyr district. It is awnless, and yields whitish grains 8.8 mm. in length and 2.6 mm. in breadth which are of medium quality and quite agreeable to taste.

Paddy is the most important cereal crop of Bihar, and the *aman* paddies, which are transplanted from July to August and harvested from late October to December, are the major source of rice in the State. The early *aman* paddies are harvested from the last week of October to the end of November, and cultivators prefer to take a *rabi* crop, particularly wheat, after that. Being an early variety, *BR 34* fulfils that need also.

Before recommending *BR 34* to farmers, several trials with early *aman* paddies suited to different tracts of the State were conducted from 1956-1958 at Government farms as well as on farmers' fields. The improved varieties *BK 115*, *BK 141*, *GAE-1* and *BR 34* were tried, and their performance also compared with the local variety of each tract. *BR 34* outyielded all the other varieties in all the Divisions of the State. Although the varieties were subjected to different climatic conditions, their behaviour was practically the same everywhere.

The yield trend of *BR 34* indicates that it is suitable for the varied soil and climatic conditions of Bihar, ranging from the scanty rainfall to heavy rainfall areas of Purnea district and from the sandy tracts of Saharsa to the hilly tracts of Chhotanagpur. Its percentage of increase over the local is very high and varies from 8.22 per cent in the Patna Division to 35.34 per cent in the Bhagalpur Division.

The variety has also excelled in unit-weight, i.e., weight of a 1,000 grains throughout all the Divisions of the State. Its heavy grains evidently contribute towards its higher yields.

—::●::—

A GREAT FOREIGN EXCHANGE EARNER

Lemongrass, the red-stemmed growth of the hilly slopes of Kerala, is a great foreign exchange earner. Exports of lemongrass oil, the chief constituent of which, citral, is used in manufacturing synthetic vitamin A, are valued at Rs. 1.6 crores.

Nearly 80 per cent of the world's supply of lemongrass oil is produced in India.

Almost 97 per cent of the Indian production is exported; the exports touched a record of 2,02,426 gallons in 1956-57.

Let's Talk About Dutch Agriculture

BUT for man's intervention, one-half of Holland would be either permanently or periodically under water; the low-lying country is, therefore, protected against flooding by massive dykes along the coast and along the large rivers.

Behind these dykes the land is divided up into polders (a polder is a piece of low-lying land reclaimed from sea or river), which are in turn surrounded by further dykes. By means of windmills and electric or diesel pumping-stations, the excess water from the polders can be pumped into the rivers or canals, whence it is usually carried off to the sea.

Consequently, during periods of heavy rainfall the low-lying land is not adversely affected by superfluous water. In times of drought, on the other hand, water can be admitted to the polders.

The system of water management enables the ground water-level to be regulated according to the requirements of the crops. Thus, in a polder under field crops the water is generally kept at a low level, whereas in a polder which is used as pasture it is maintained at a high level.

Holland is renowned for its large-scale impoldering projects (including the Zuider Zee works), but the land gained in this way cannot offset the loss of cultivable ground resulting from the expansion of towns and villages.

Holland has a total land area of only 30,000 sq. km. (approx. 11,600 sq. miles), of which just over one-fifth is required for purposes other than agriculture, so that about 23,000 sq. km. (approx. 8,900 sq. miles) is left for agricultural use. Consequently, with a population of

Top: **A well-tended orchard come to flower; the ground is used as pasture**

Middle: **Poultry-keeping is fast becoming popular with the Dutch farmer, and...**

Left: **...modern machinery lightens his task**

11.2 million, Holland has scarcely more than 0.2 hectare (a hectare = 2.47 acres) of cultivable land per head.

The country is for the most part entirely flat; the only elevations occur along a stretch of the coast (in the form of dunes) and in the south and east.

VARYING SOIL

Soil conditions in Holland vary very greatly. In the south and east there is sandy soil, with river clay along the large rivers, peat deposition along the lesser ones and a mixture of peat and sand in the districts where low moor peat formations have been dug away.

In the west, along the coast, there is a range of dunes, behind which a strip of light sandy soil (sand and peat) occurs. Between the dunes in the west and the sandy soil in the east there is an extensive region of fen peat. At some points, this layer of peat has disappeared and the underlying old marine clay is exposed.

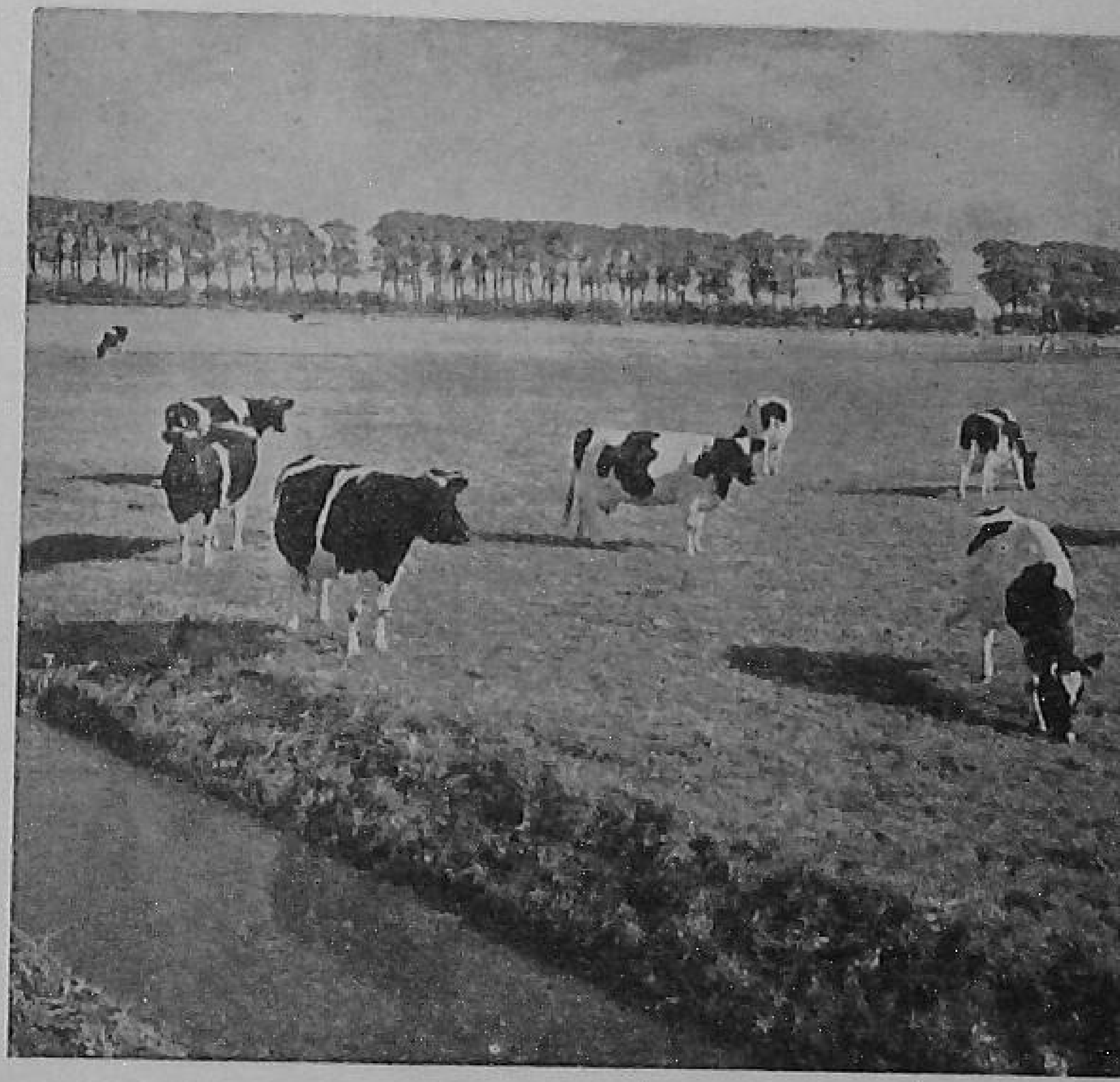
In the south-west and north of the country are found the younger marine-clay soils, which also occur in the Zuider Zee polders.

Holland has a pronounced oceanic climate with predominantly westerly winds, which bring mild, moist air from the sea. The average maximum day temperature in July is 21°C (69.8°F), while the average minimum night temperature in January is −2°C (30.2°F). The annual rainfall averages 740 mm. (29.1 inches) and is fairly evenly distributed throughout the seasons.

SMALL ESTATES

Large estates are practically unknown in Holland; altogether there are only 150 holdings of more than 100 hectares and these account for less than 1½ per cent of the available cultivable land. Of the 178,000 farmers just over 100,000 have less than ten hectares of land at their disposal, 50,000 between ten and 20 hectares, and slightly over 25,000 twenty hectares or more.

Approximately 500,000 people, or a little under 12 per cent of the working population, are employed in agriculture in Holland. The execution of large-scale land exchange and re-allocation plans is further improving the efficiency of the farms, as a result of which the labour requirements are decreasing. The mechanization of agriculture is increasing by leaps and bounds, in consequence of which the labour force can be expected to decrease even more.



Top: **A number of vegetables are grown in these hothouses near The Hague**

Middle: **The Dutch black-and-white dairy cattle are renowned for their high milk yield**

Right: **Fields of grain on what was formerly the bottom of the Zuider Zee**

Large quantities of vegetables are still brought to the auctions by barge

Although the average size of the farms is small the number of mechanical aids is still constantly increasing. The number of tractors rose from about 4,000 in 1940 to 24,000 in 1950 and 61,000 in 1957. The number of milking machines increased from 9,000 in 1955 to 23,000 in 1958 (39,000 appliances). The farms are very well provided with ploughs, harrows, cultivators, mowing machines, hoeing and turning machines, sowing and planting machines, manure-spreaders and spraying or misting equipment.

Particularly careful attention is paid in Holland to the fertilization of the land. In addition to the natural manures obtained from Dutch farm animals and the compost produced from the domestic refuse of the large cities, very large quantities of artificial fertilizer are used. Holland's consumption of artificial fertilizer per hectare of cultivable land is the third highest in the world. The soil, which in many cases was formerly infertile, has been made fertile by the farmers.

CREDIT BANKS

Scattered throughout Holland are hundreds of co-operative farmers' credit banks in which the farmers can deposit their money and from which, in most cases, they can also obtain loans to finance and/or improve their farms. The banks are amalgamated in two large central co-operatives. Various farm necessities, including artificial fertilizer and feeding-stuffs, are often centrally purchased by the agricultural co-operatives.

There are in Holland 23,000 day and evening schools at which primary agricultural education is provided and another 200 for agricultural education at the secondary level. In addition, there is an agricultural university. The total number of pupils and students is about 63,000.

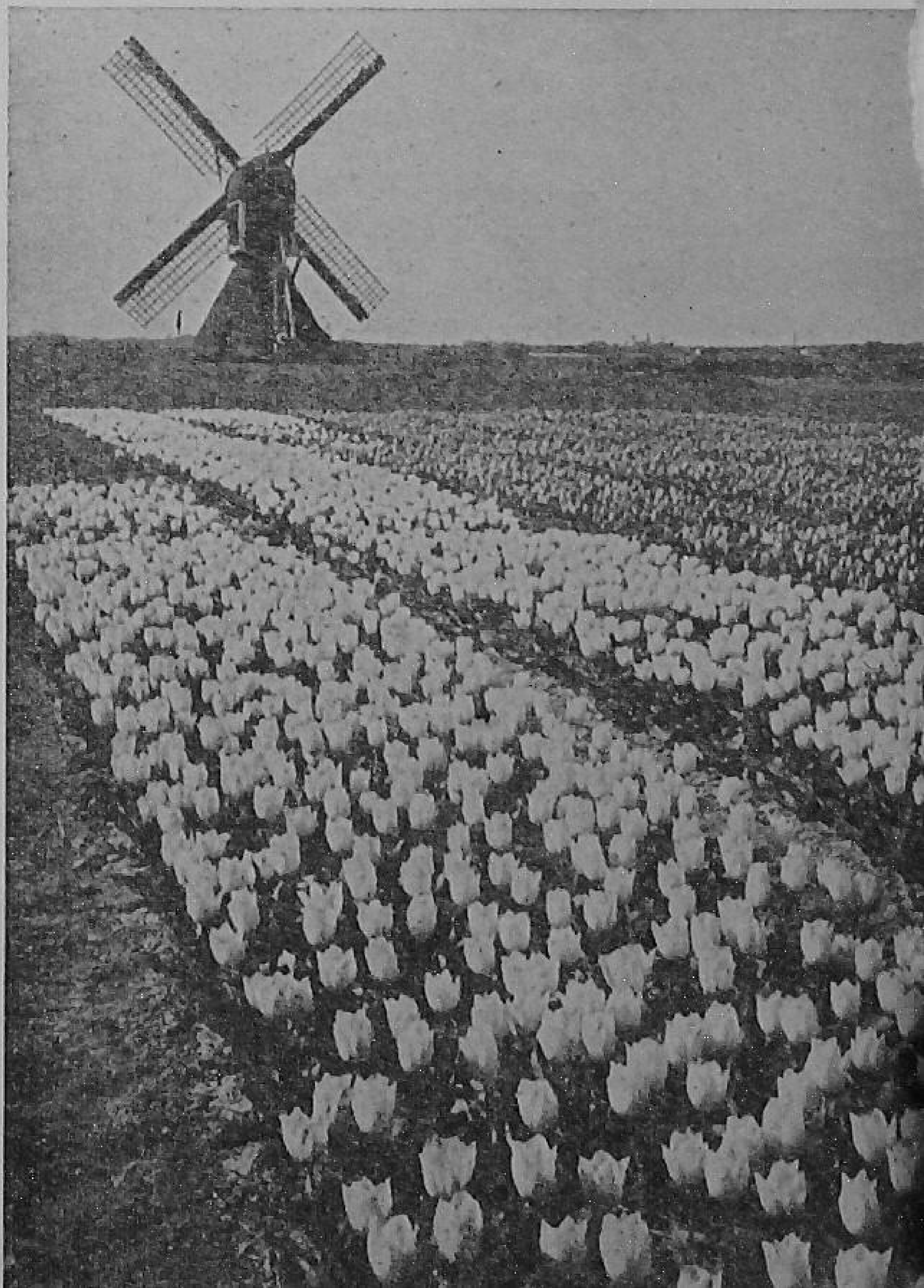
Farmers and horticulturists can avail themselves of the services of Government advisors in the fields of arable farming, horticulture and stock-breeding. At the Government agricultural experimental stations, new breeds of animals and methods of cultivation are tried out and new means are sought for the protection of plants against disease. Agricultural science is at such a high level in Holland that many foreigners go there to study it or to take special courses in that field.

Arable farming in Holland is carried on in the sandy soils, the river-clay and marine-clay soils. On the sandy soils, mixed farming (arable farming and stock-breeding) predominates; on the river clays, fruit is grown as well; on the marine-clay soils, the accent is on arable farming proper.

PRINCIPAL PRODUCTS

The area under field crops amounts to 900,000 hectares, i.e., 39 per cent of the total acreage of cultivable land. The principal products are cereals (rye, oats, wheat and barley), ware CONTD. ON PAGE 39

An inevitable tourist attraction are the bulb-fields in flower



Plan

YOUR IRRIGATION SYSTEM

by

N.B. Pradhan

**Basic Agricultural School
Adhartal, Jabalpur**

TO get the maximum out of his crops and the irrigation water at his disposal, the farmer must *plan* his irrigation system.

Efficient irrigation means that only so much water is applied to the soil that the moisture-content in the root-zone conforms to its normal moisture-retaining capacity. Any extra water added is lost by percolation. This loss is bad, not only because it is waste of water, but because it raises the water-table in low areas, causing water-logging and salinity. These conditions are very harmful to crops.

As the moisture from the soil is lost either by evaporation or transpiration, a point is ultimately reached when the remaining water is so tightly held by the soil that it does not become available to the plant roots. As a result, the plants wilt. Irrigation should be resorted to before the moisture-content in the soil falls to the wilting point.

Irrigation is primarily the practice of supplementing the rainfall. When long breaks occur between rains, crop growth is retarded. Irrigation, therefore becomes necessary to assure a continuous and rapid growth of crops.

India has perhaps the largest irrigated area in the world, but the irrigation methods generally adopted by farmers cannot be said to be quite efficient. In planning an efficient irrigation system for your farm, many important factors have to be taken into consideration.

SMOOTH SURFACE

An ideal field for irrigation is one which has a smooth surface and a slope of about 0.3 to 1.5 per cent (1/3 foot to 1½ feet fall in a linear distance of a 100 feet). Slopes up to five per cent can be irrigated without much difficulty. Slopes up to ten per cent can also be irrigated, but the cost of levelling and laying out the irrigation system would be prohibitive. Slopes steeper than this may better be utilized for growing grasses.

For giving the land the desired slope, it may be levelled in such a way that no pockets or small hillocks are left, so that the water gets distributed evenly. At the same time, care should be taken not to expose the subsoil.

IDEAL SOIL

An ideal soil for irrigation is a deep fertile loam or sandy loam with good drainage. A medium type of soil is better than either a too light or a too heavy one. The soil profile has also to be taken into account. The subsoil must allow proper drainage.

The problem of alkali is very important in dry regions. The soil should be largely free of salts and absorbed sodium, or should be adaptable to reclamation. On the basis of alkalinity, soils may be classified as below.

Salt-free soils	0 to 0.2	per cent
Low salt concentration	0.2 to 0.35	„
Moderate salt concentration	0.35 to 0.65	„
Strong salt concentration	Over 0.65	„

The last two soil-types are unsuitable for most commercial crops. If the soils have proper drainage and if enough water is available, some of these may be leached out, although it may need some time and money.

GOOD WATER

Just as soil, the water available for irrigation should also be free of salts, or it will lead to

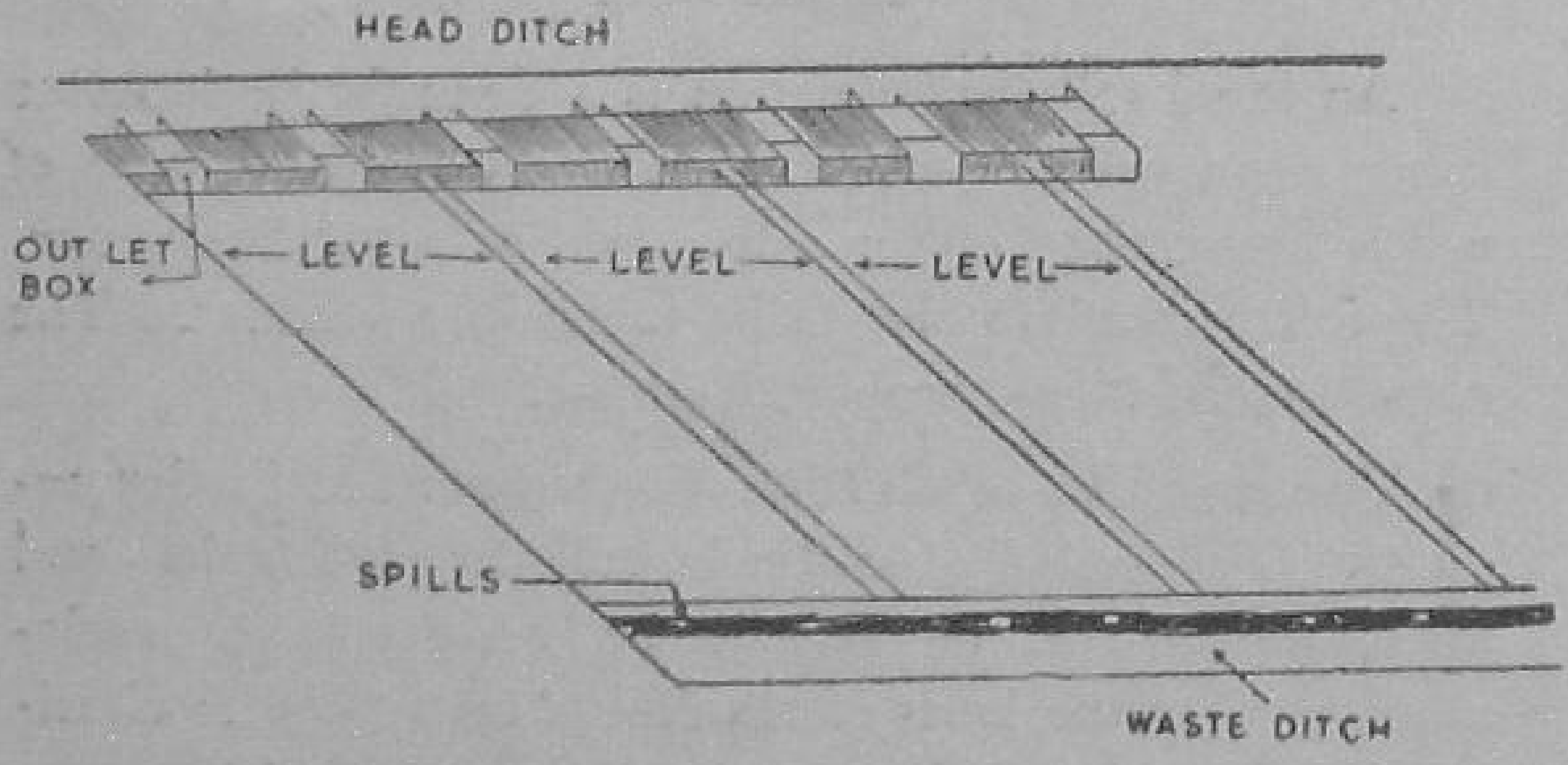
alkali deposits in the soil. Economic farming can be assured only by a proper use of land and water. Improper use of these may create new problems such as soil erosion, alkali accumulation, leaching or water-logging, and render land unfit for production.

It may not be very difficult to irrigate crops like paddy (which is grown in bunded and fairly level fields), sugarcane and some vegetable crops (which are planted in furrow beds). But the most difficult task is to lay out an irrigation system for wheat fields which are generally undulating in all directions. The problem becomes all the more acute when the land has to be irrigated from a canal and when a certain cultivator refuses to allow the water to pass through his fields.

HOW TO IRRIGATE

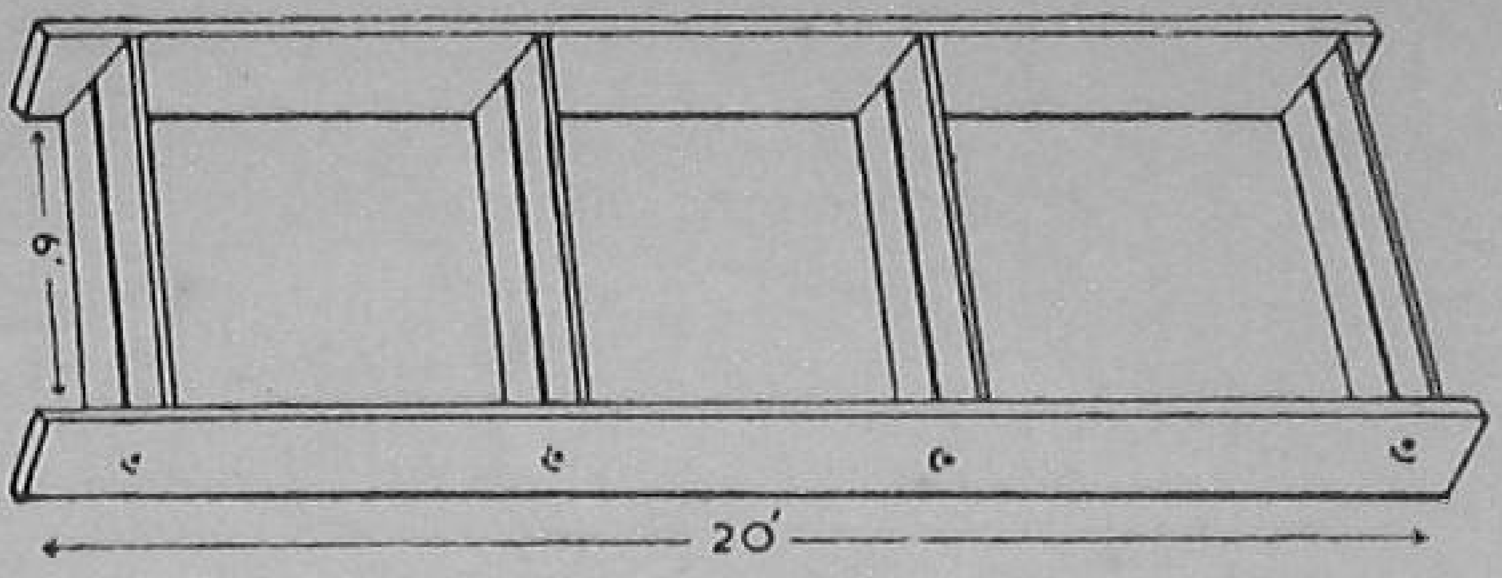
Of the irrigation methods commonly adopted in India, flooding is the least efficient. It consists in opening a water channel so that water may flow about in all directions. Men with wooden shovels guide the water-flow by making a small channel or bund to cover as large an area as possible. This method requires abundant water and is usually adopted for close-growing crops in open fields like wheat and gram. It does not involve the cost of making irrigation beds, but the distribution of the water is very uneven.

The basin or *kyari* method is commonly used for paddy and some vegetable crops. In this case, each bed (*kyari*) or basin is levelled and is surrounded by a few inches to several feet-high bunds. The method is adopted in soils like sandy loam and loam, and for crops like paddy where water has to stand a few inches deep in the beds. In this case also an abundant supply of water is needed.



Border strips

The method is commonly used for sugarcane, potatoes and some other vegetable crops which need earthing. On slopes, the furrows must be made in contour or across the slope. The irrigation water does not come in direct contact with the roots of the crops and has to soak down. Skilled labour is necessary for making furrows as well as for conducting the irrigation.

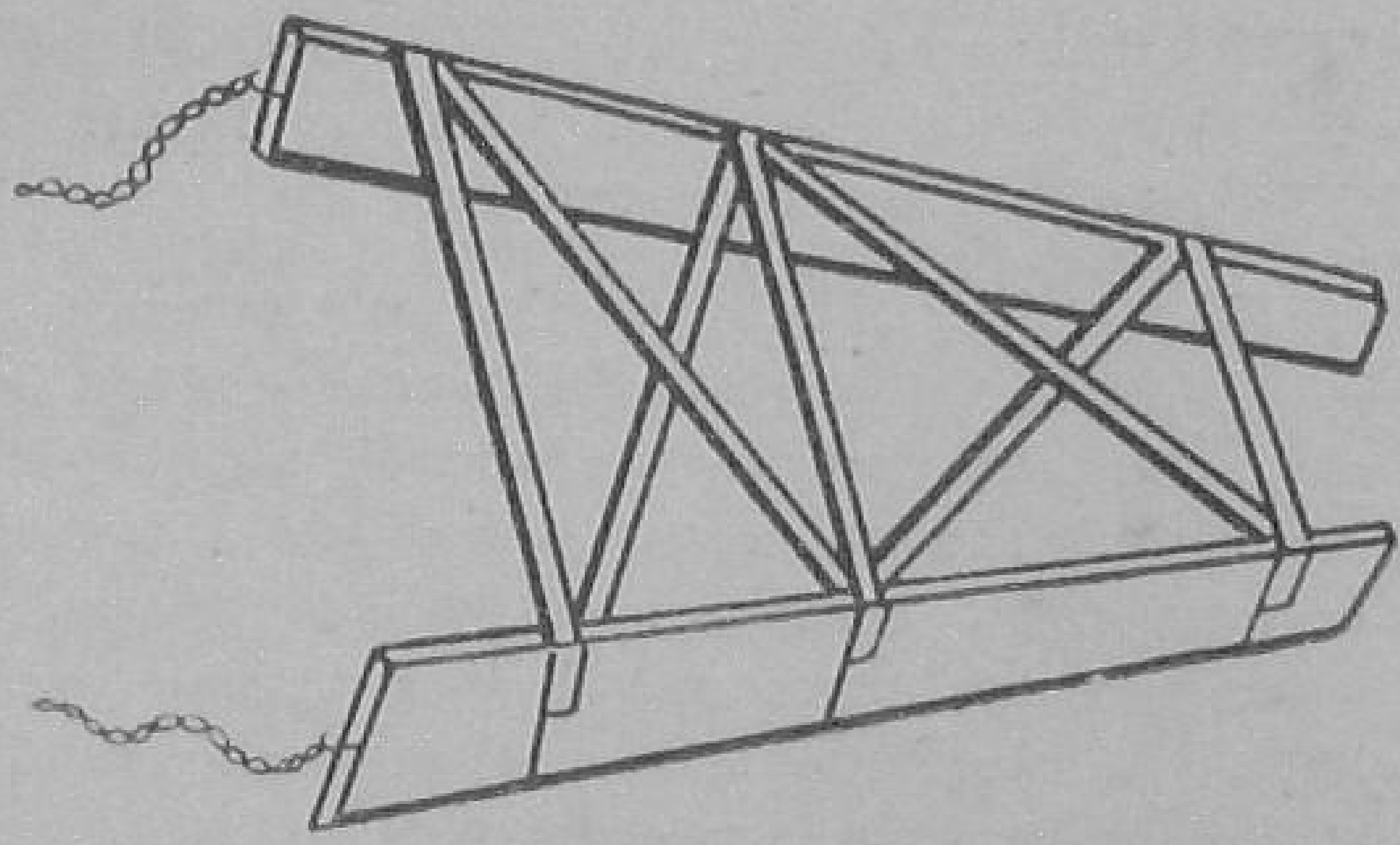


A float

There are other methods like sprinkler irrigation and sub-irrigation which are very costly and beyond the reach of an ordinary farmer.

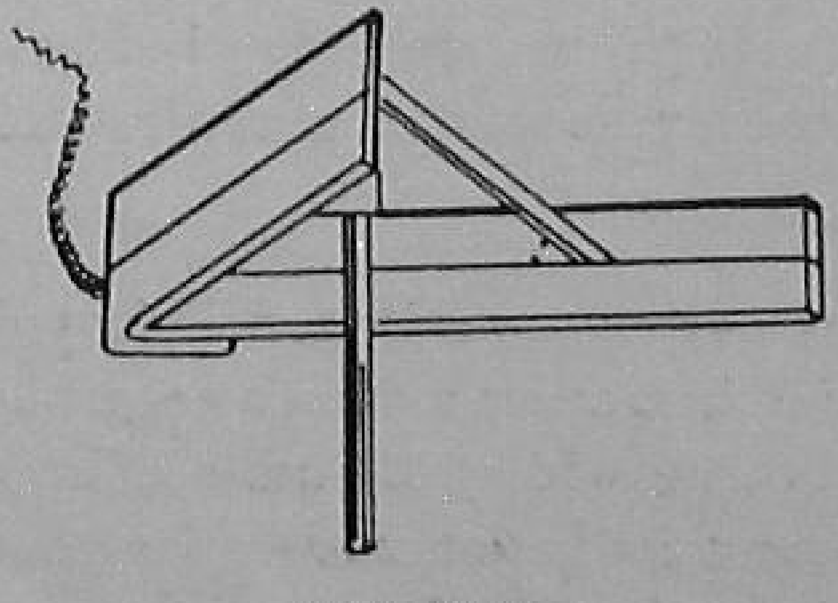
TWO GOOD METHODS

The border strip method and contour ditches are two improved methods of irrigation which would help the farmer design an efficient irrigation system for his farm. Before laying out such a system for wheat fields, one has to find out the topography of the field. If the fields are level on one side and gradually sloping along the other, border strips may be prepared. For an undulating surface, contour ditches are recommended.



A bund-former

A **border strip** is a narrow tract of land with small ridges on all sides. The land is smoothly graded in the direction of irrigation, with no cross-slopes so that the water will flow uniformly. Irrigation by this method gives a uniform distribution of water and prevents waste. You can also avoid having too much irrigation in low

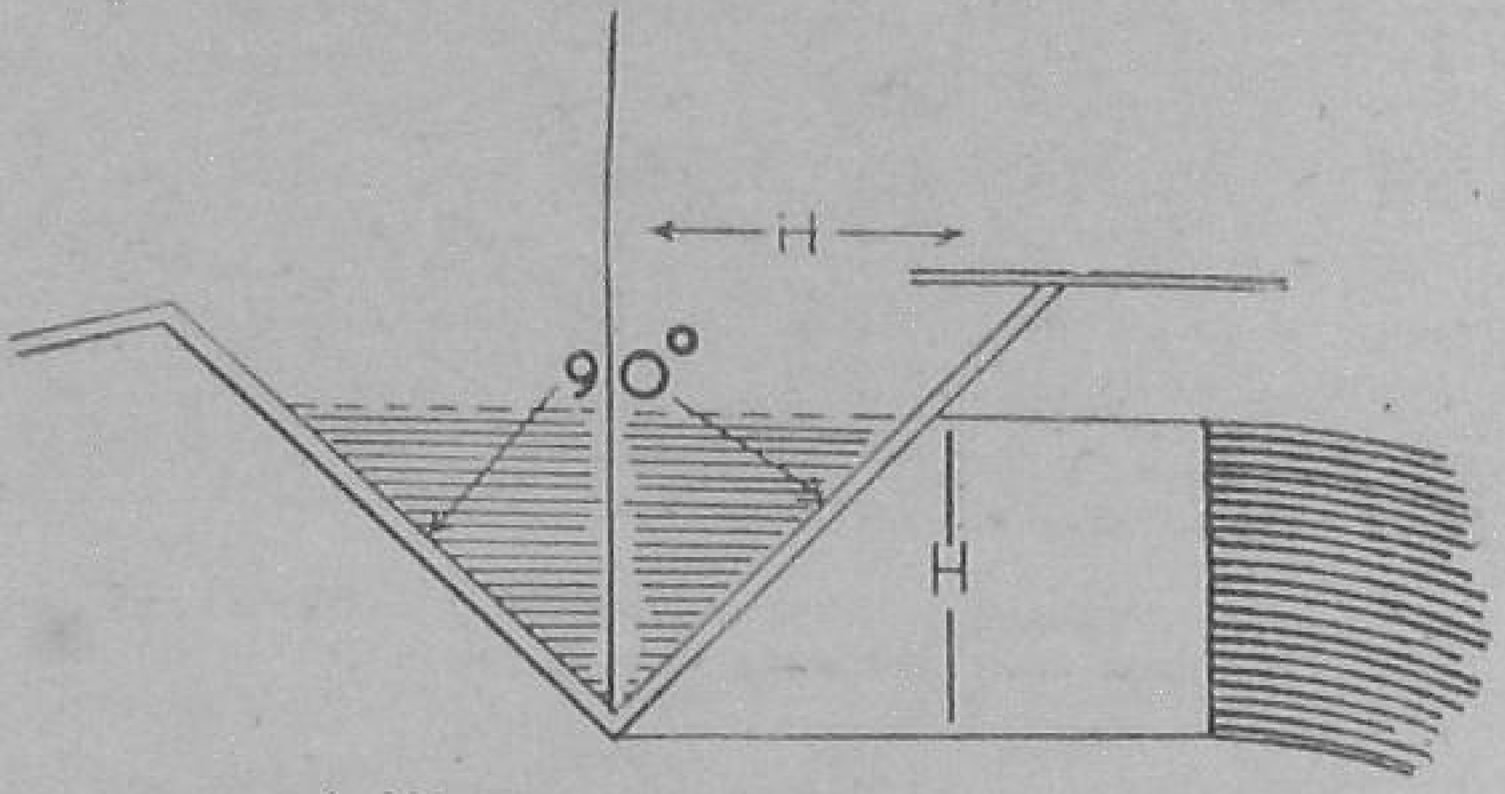


A V-ditcher

spots and too little in high ones by grading the land properly.

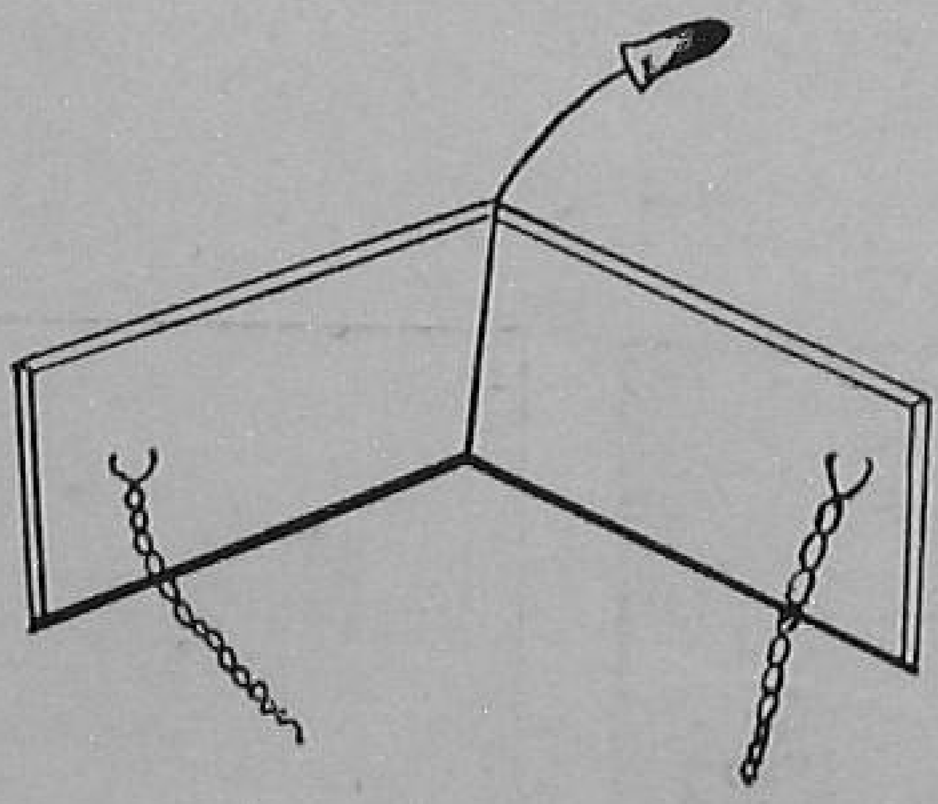
The length and the width of the strips depend on the soil texture, the slope of the land and the water flow. In light soils, or with a small flow of water, the size of the strip can be reduced. Depending on these factors, the width can be from ten to 50 feet and the length from 30 to 400 feet.

Besides the common plough, the implements required to prepare border strips are: a float, a bund-former, a V-ditcher and a scraper.



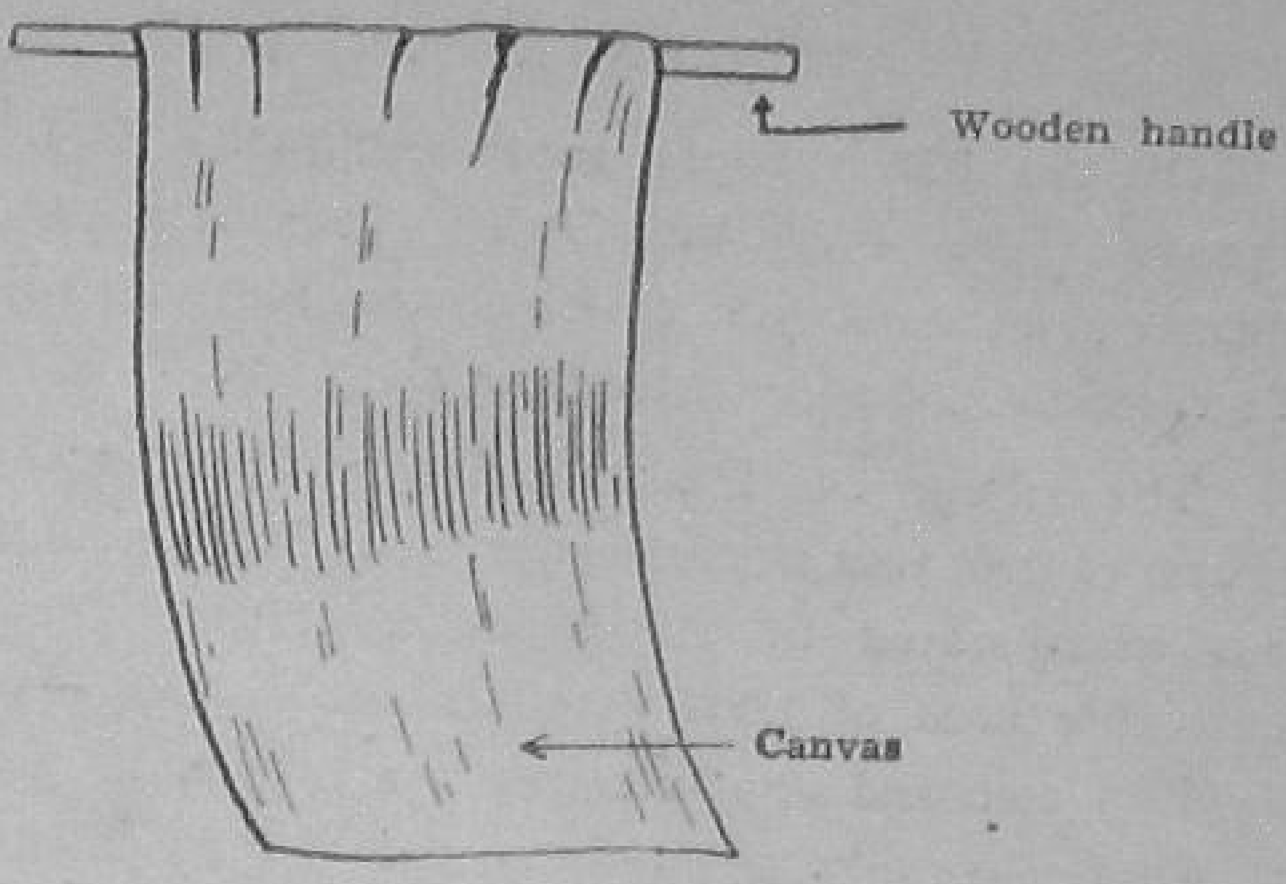
A 90° V-notch as seen from front

Plough and cross-plough to loosen the soil, leaving no hard spots. Mark the location of the head-ditch along the higher side of the field and the waste ditch along the lower side. Determine the width of the strips and mark the position where ridges are to be made. Remove the soil from the higher spots and fill in the low spots to make the strip level. This is done with the scraper.



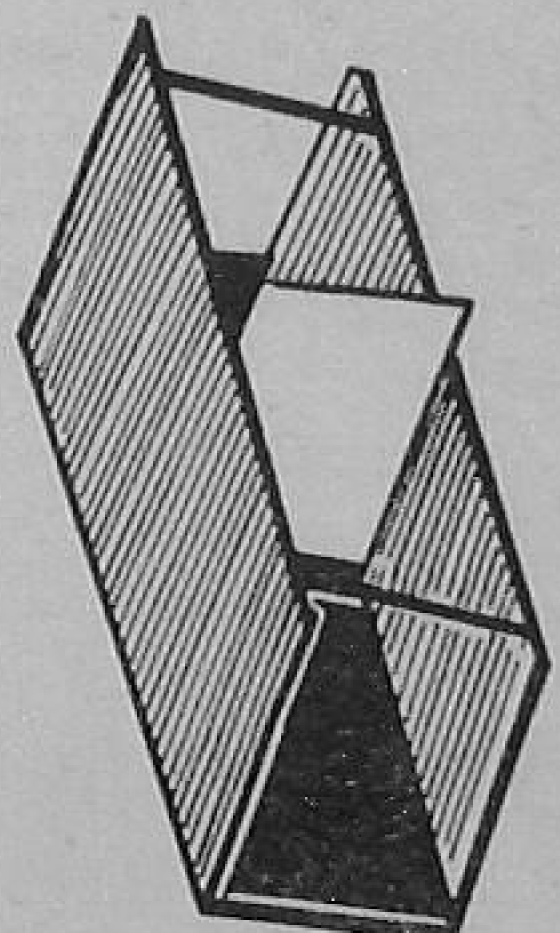
A scraper

Plough and cross-plough again, so that further levelling can be done. This is best done with a simple wooden implement called the "float." Make the head ditch with the V-ditcher. The bed of this ditch should be higher than the strips. Then make ridges along the marked line with the help of the bund-former. Scrape uniformly from both sides of the ridges. About 20 feet of the land below the head ditch must be perfectly level and then uniformly graded along the length of the border and again level along the width. Dig a waste ditch along the lower end of the strip.



A canvas dam

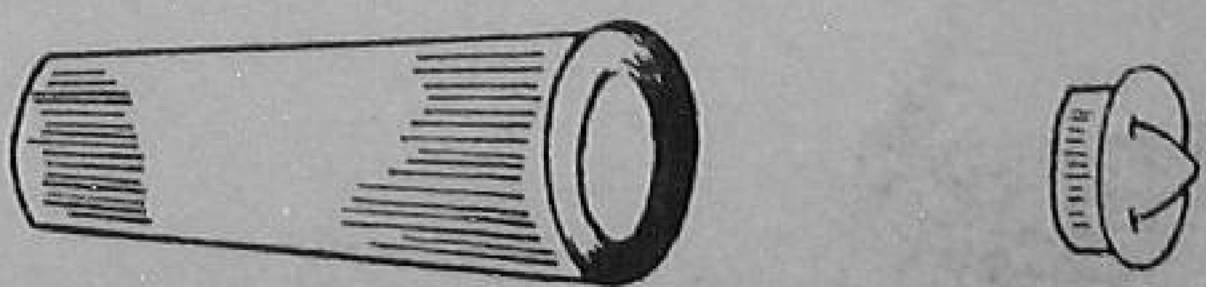
Fix turn-out boxes or earthen spills to regulate the water flow from the head ditch into each border



A turn-out box with shutter

strip. A canvas dam may be used to divert water from the ditch into the turn-out boxes. Earthen spills may be fixed at the lower end to let water into the waste ditch.

For **contour ditches,** the contour lines have to be marked in the fields. A gradual grade of about one to two inches for every 100 feet may be given to these ditches to allow a gradual flow of water. The land



An earthen spill with lid

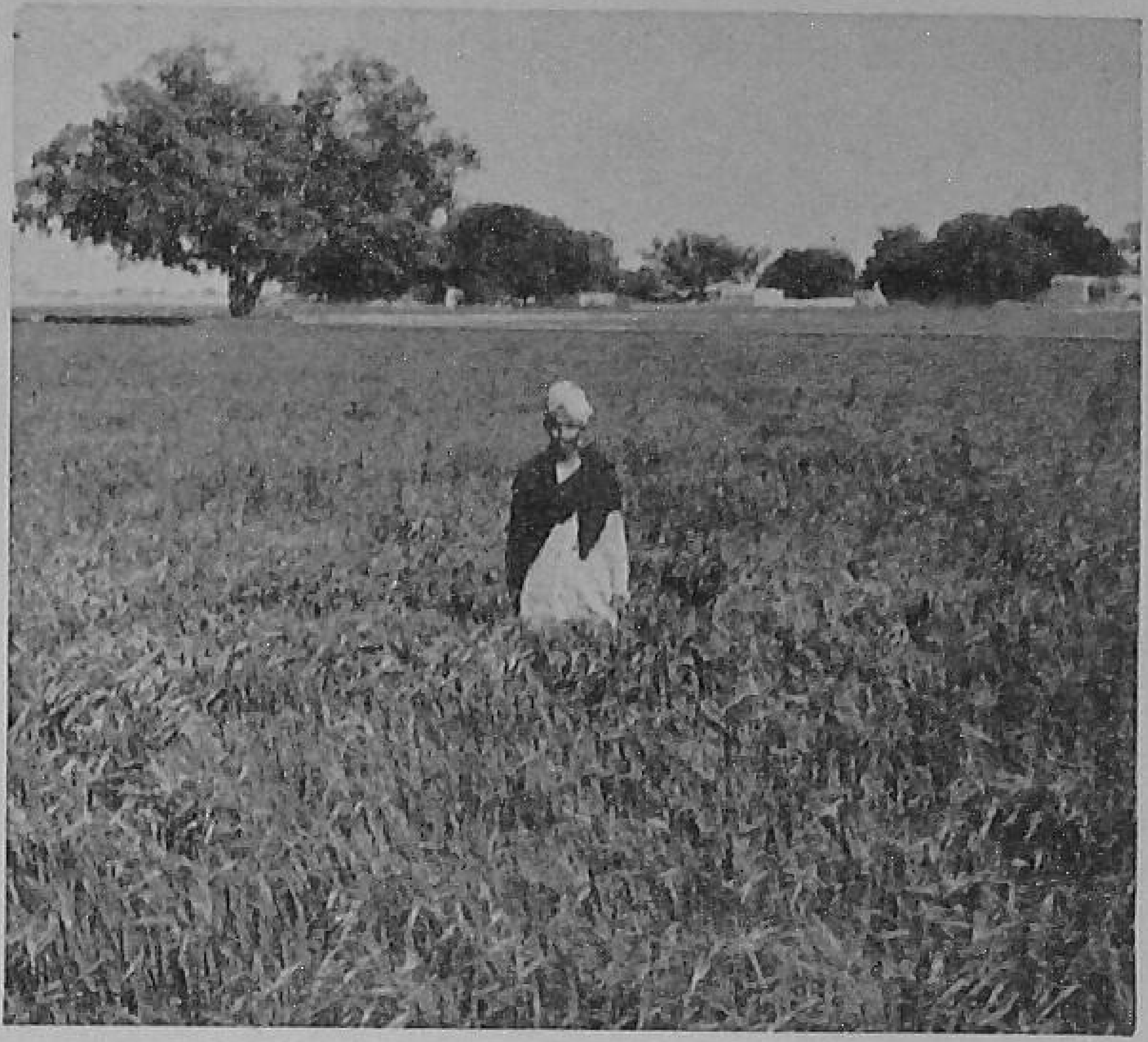
between the two contours may be levelled and irrigation done in the same way as in border strips.

To find out whether enough irrigation has been done, a probe may be used. Th's is an iron bar about half an inch thick, pointed at one end and fitted with a handle at the other. Press this probe into the soil: it will penetrate easily as deep as the water has reached. Pull it out and find out if sufficient depth has been irrigated; if not, irrigate more.

Paprawat Excels

Of the 305 villages constituting the five Development Blocks in the Union Territory of Delhi, Paprawat in the Najafgarh Block was recently adjudged the most progressive in farming methods.

The village has maintained a really commendable record of progress since the National Extension Service was inaugurated in the Block in 1953. The entire cultivable area of 1,247 acres is under *C.281*—a high-yielding, rust and smut-resistant, early-maturing variety of wheat; equally popular is the *N.P.58* gram. The targets originally fixed have been exceeded in many cases: 120 Persian wheels as against 60; 200 compost pits as against 150; 1,450 maunds of ammonium sulphate, superphosphate and urea as against 850; 200 agricultural demonstrations as against 150.



Paprawat farmers prefer to grow *C. 281* wheat, for then they are sure of a good crop

The wheat yield in the village has gone up from 12 maunds to over 30 maunds per acre, and the cultivator has gained an additional profit of Rs. 180 per acre. On two model farms, yields as high as 45 maunds per acre have also been recorded.

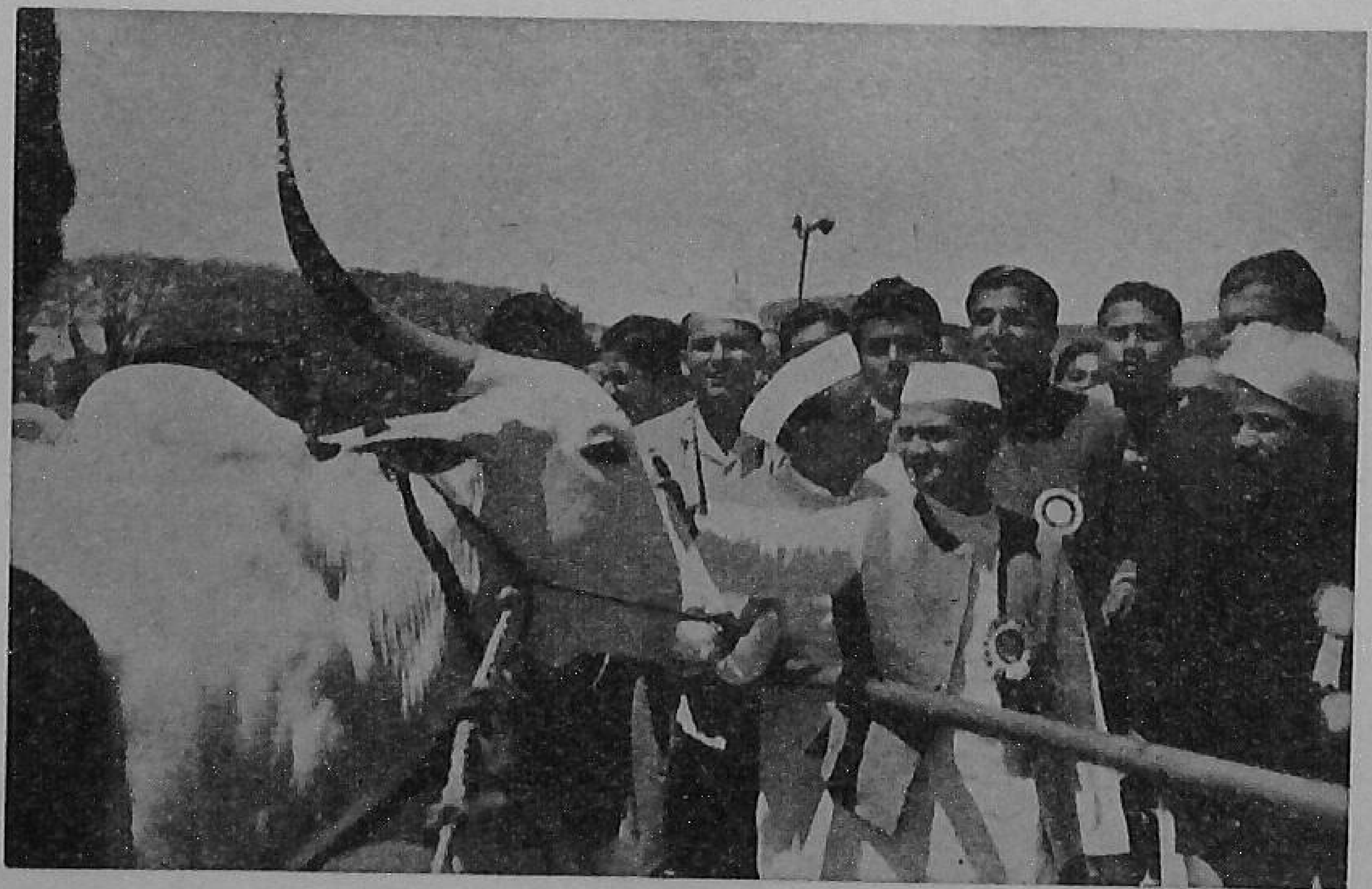
The Paprawat farmers raise their wheat crop by what has come to be known as the Delhi Method. First of all, they ensure that no stubble of the previous crop is left in the field; it is then given eight to nine ploughings. Six to eight weeks before sowing, farmyard manure at ten cartloads per acre is applied to the field. The crop also gets a maund of ammonium sulphate and a maund of superphosphate per acre.

Seed at 50 seers per acre is used, and the crop sown

Bangalore Cattle Show

About a 1,000 entries for cattle, a 1,000 for poultry and 60 for sheep and goats, apart from horses, etc., were received at the 17th All-India Cattle and Poultry Show held at Bangalore from February 22 to March 1 this year.

Picture shows Shri Lal Bahadur Shastri, Union Minister of Commerce and Industry, who inaugurated the Show, admiring a bull.



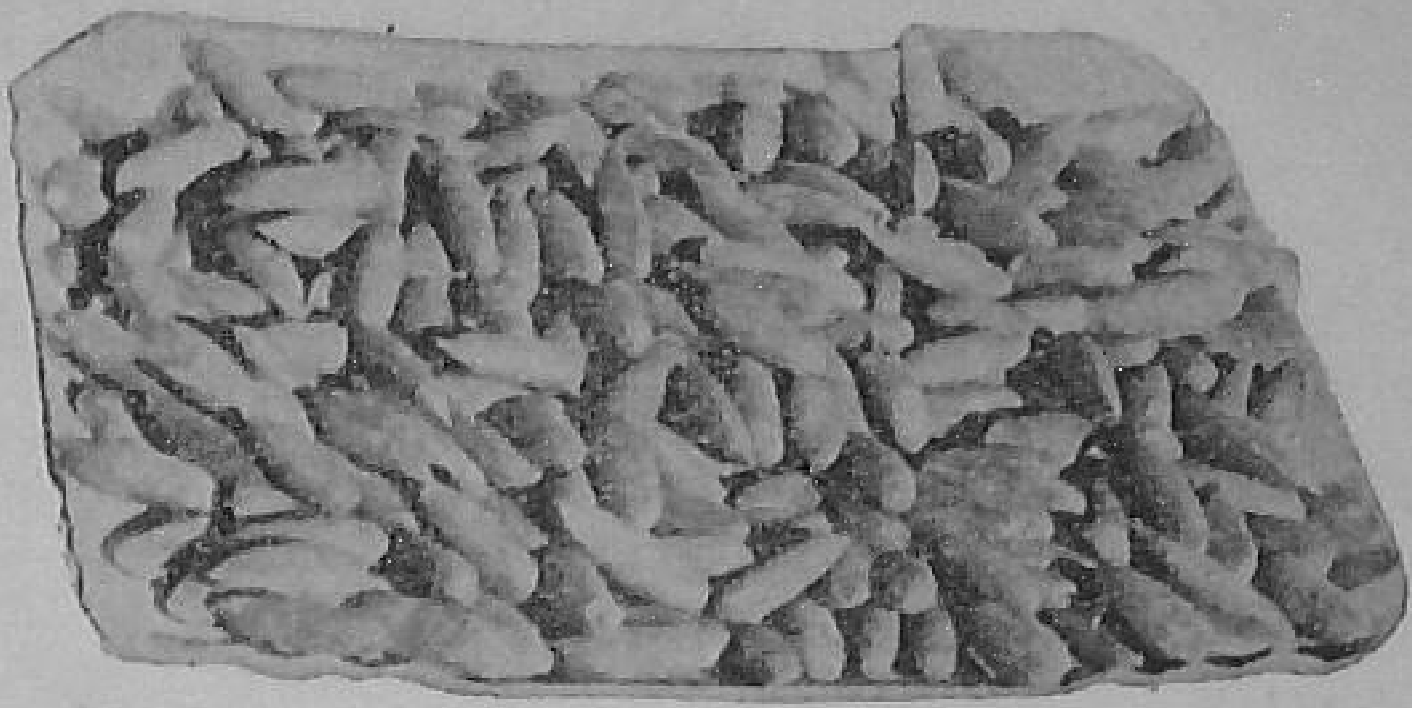
News and Pictures

in lines. As the soil of the village is sandy loam, at least five irrigations are given to the crop—four up to January and the last one in February. When the crop is about a foot high, all weeds like *piazi*, *bathu* and *pohli* are pulled out. Adequate steps are taken to save the crop from insect pests and rats.

Rampur Agricultural Show

For the last two years, the Himachal Pradesh Department of Agriculture has been putting up an Agricultural Produce Show at Rampur (Bushahr) at the time of the annual Lavi Fair from November 11 to 13.

The Show has caught the imagination of the hill people, and the number of entries received has increased from 650 in 1957 to 1,400 in 1958. Excellent quality dry fruits, such as pine nuts, hazel nuts, walnuts and almonds, which grow only in the Chini area, were exhibited at the Show last year. Exhibitors of winning entries were awarded a number of cash prizes and trophies.



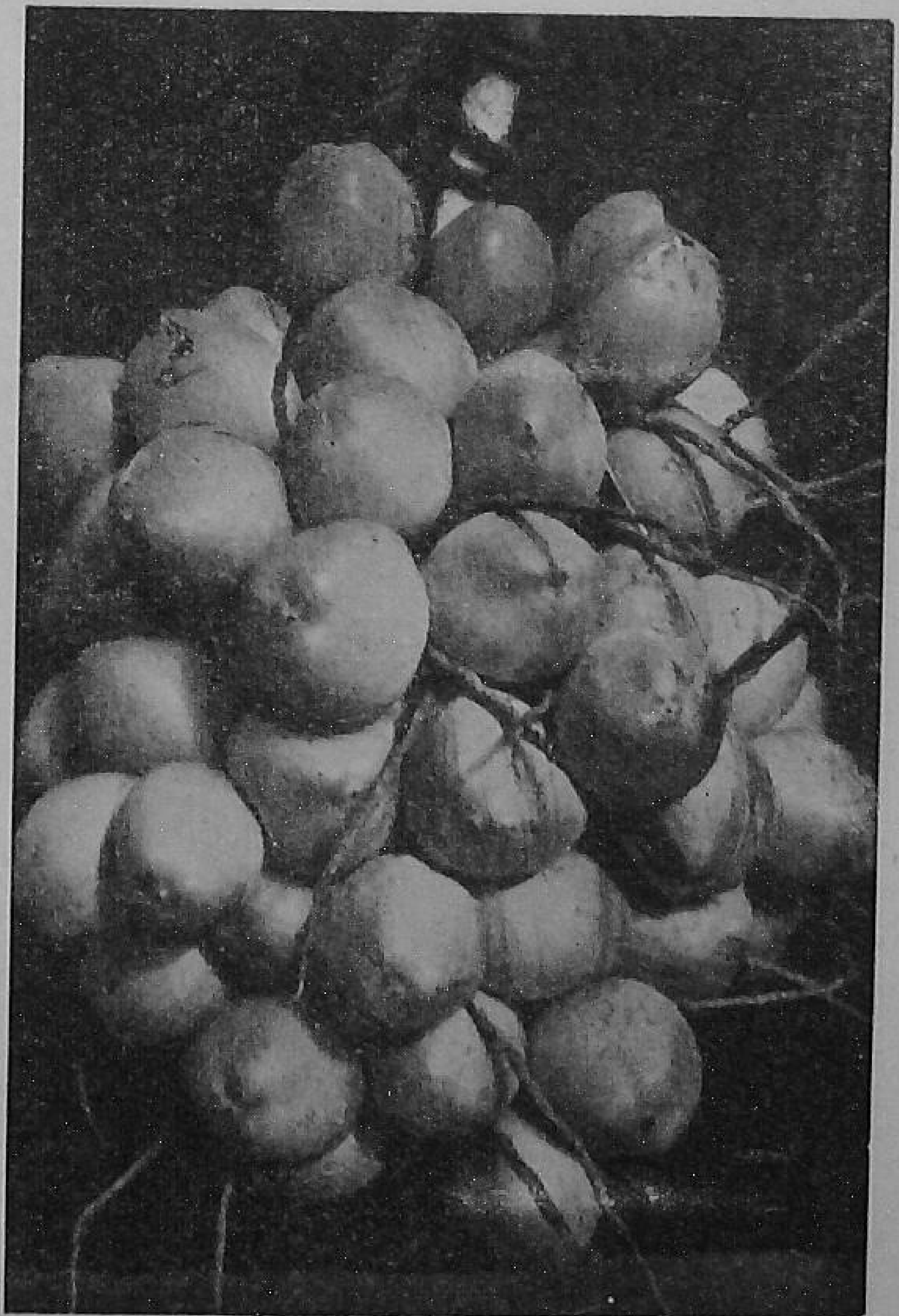
Prize-winning chilghozas at the Show

The Lavi Fair derives its name from *loi*, local for a woollen blanket. It is in fact a trade *mela* for the hill people who come to attend it from as far as Tibet Chini, Lahaul and Sipiti. They bring *pattus, lois*, shawls, *pashmina*, raw, fine and assorted and other types of wool, and mules and horses, which traders from different parts of India assemble at the *mela* to buy. On return the villagers buy utensils, foodstuffs and other articles of daily use with the money thus earned.

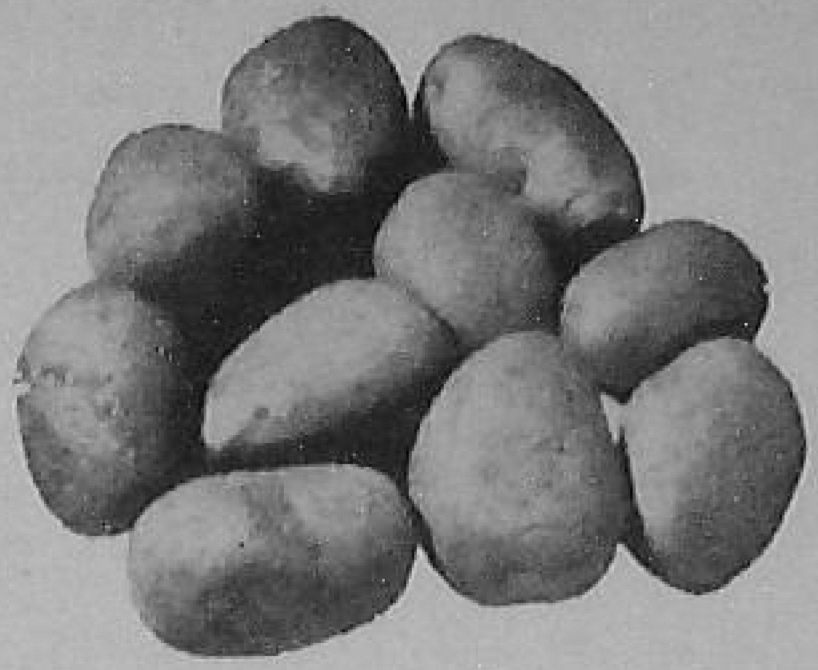
Raw wool is traded in large quantities at the Lavi Fair. A hill tribesman using an indigenous scale

83 Coconuts A Bunch →

This bunch of 83 coconuts is from a palm in the two-acre garden of Shri Kottakudi Venkatrama Naicker, of Pattukottai in Thokkalikadu in Tanjore district of Madras State. Most of the palms in his garden yield heavily due to regular ploughing thrice a year, cattle-penning, and application of tank-silt and wood ash.



try these tasty potato snacks



WE would not eat, as we do today, just nine pounds of potatoes per head per year if we knew how high the potato ranks as an article of diet. Its carbohydrate content, the chief energy-producing constituent, is about the same as that of wheat bread; the body-building protein content is lower, but its quality is very high. It is a rich source of vitamins C and B_1. In Holland and in many other countries it appears on the table daily.

And then, the potato is a versatile product. You can boil it, bake it, roast it and fry it, and you can mash it, use it in salads, and so on. Here are a few tasty snacks that the potato can provide you.

FRIED POTATOES

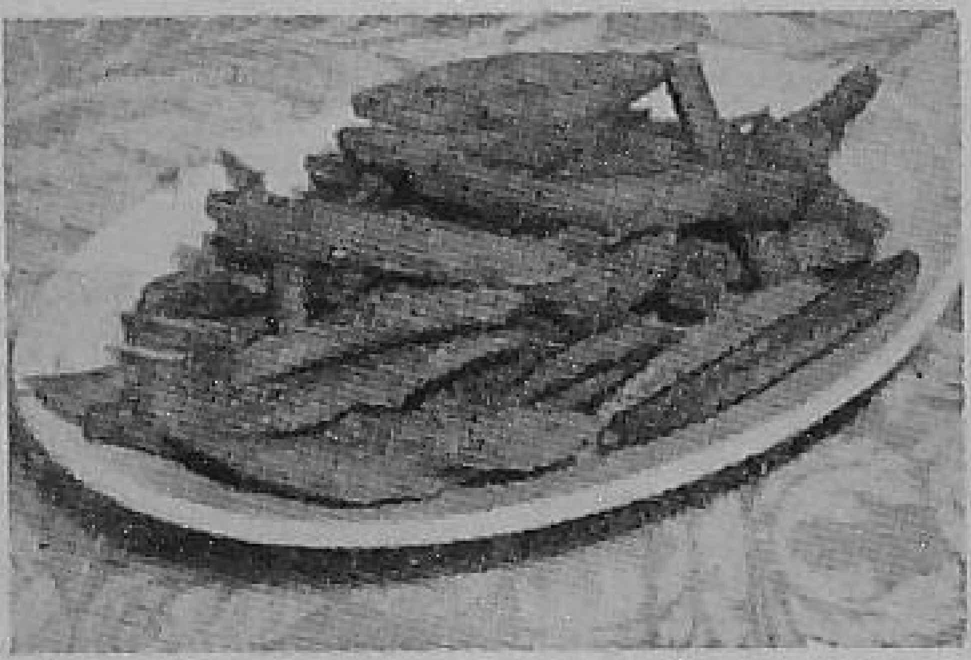
(made from raw potatoes)

Potatoes One seer 2 *chhataks*
Salad oil 1¼ *chhataks*

Peel the potatoes, wash them and cut them into slices (small new potatoes can be left whole). Dry them well in a cloth. Heat up the oil, not allowing it to smoke, in a frying pan, and fry the potatoes in this for ten minutes until they are partly done (put a lid on the frying pan—turn the potatoes now and again). Then let the oil get hot enough to smoke and fry the potatoes without the lid until they are done brown. Sprinkle a little salt over them when serving.

POMMES FRITES

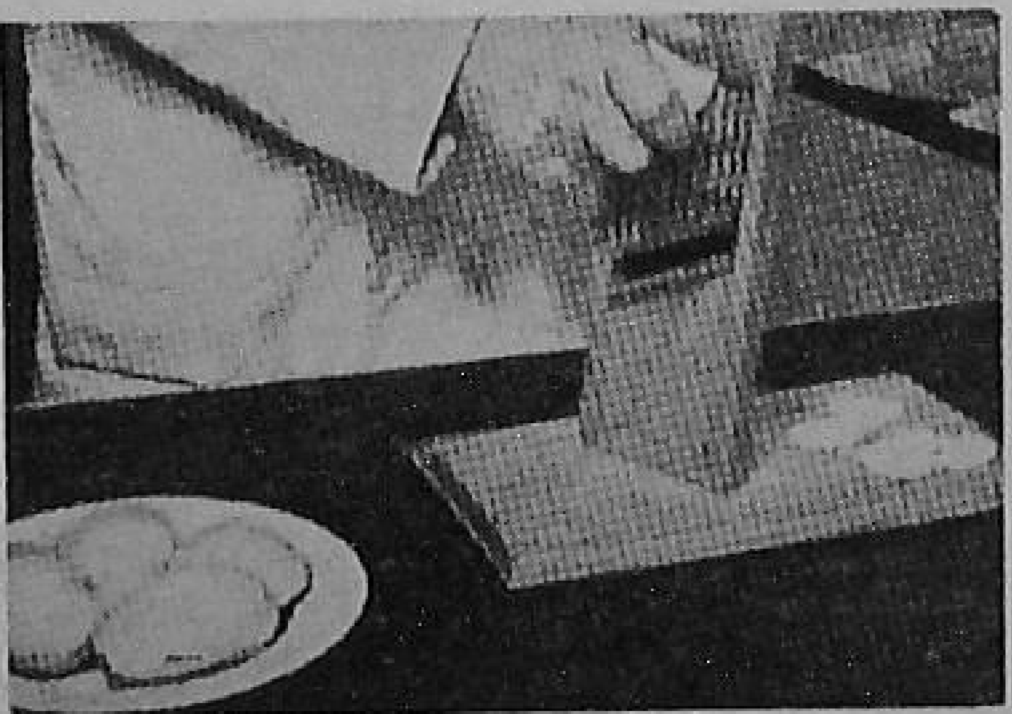
Use fairly large potatoes for this. Peel and wash them. Then cut them into slices about a quarter of an inch thick, and cut these slices into strips. Dry well in a clean cloth and then fry until done, but not brown (about 15 minutes) in a not too hot frying pan. This frying can be done some time beforehand, if desired. Shortly before required,



let the fat get smoking hot and quickly fry the strips in this until they are crisp and golden-brown. Sprinkle with a little fine salt. Pommes frites should be soft inside and crunchy on the outside.

WAFER POTATOES

Set the scalloped cutter to cut fairly wide. Pull a potato across the cutter, turn it half a turn and pull it over the cutter again. Repeat this. In this way, wafers



can be made. These are fried golden-brown in the frying pan and served sprinkled with salt.

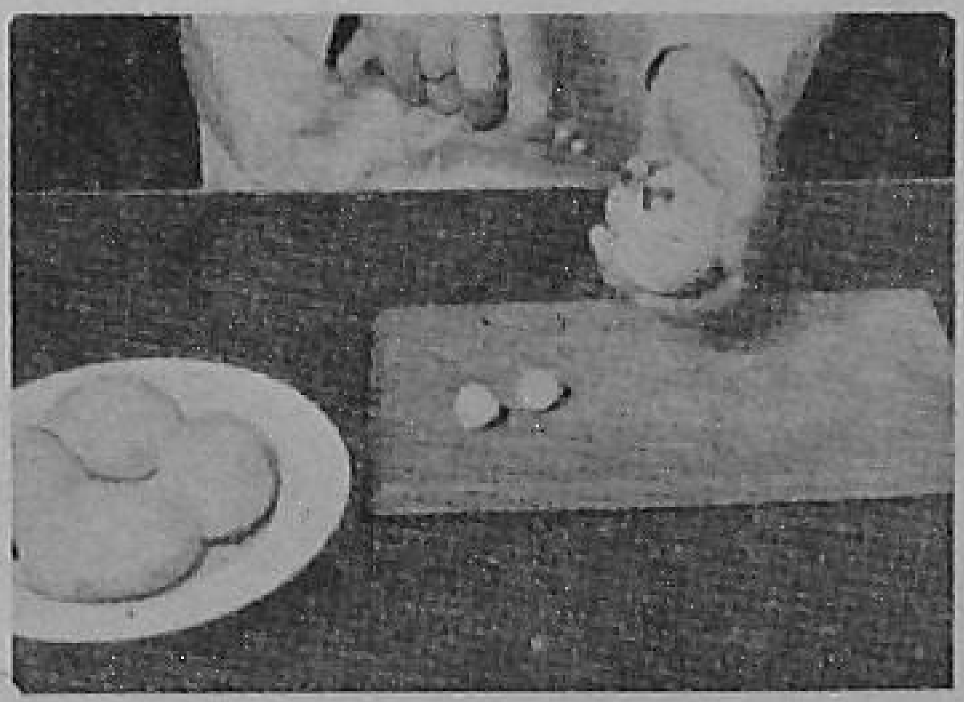
POTATO CUTLETS

Potatoes One seer 2 *chhataks*
Flour ½ *pao*
One egg, salt and frying fat

Grate the potatoes on a coarse grater. Stir in the flour, the egg and the salt dry. Pour this mixture by the teaspoonful into hot frying fat and fry brown on both sides.

POMMES PARISIENNES

By means of a potato scoop, cut small round potatoes out of a large peeled potato. Boil these until done (about ten minutes) in a little water with salt. Take care in boiling,



since they soon crumble. They can also be fried in the frying pan in butter. To do this, first fry them until half done in a tightly closed pan and then finish them off in the pan without the lid until they are golden-brown. Sprinkle with salt and serve. They go well with stewed fish.—*Recipes and pictures from "Potato News"*

More Cash From Cotton

by

Kartar Singh "Dewana"

THERE was a time when growing of cotton was not so popular with the Punjab farmer. But today he fully realizes its importance as a crop that brings cash to him. I have now been growing cotton on my farm for a number of years, and my yields have also been very good all along. In fact, any farmer who pays attention to the following few things can get better cotton yields, and thereby more cash.

Cotton needs a fertile soil. The best cotton yields are obtained when it is grown after berseem. The other alternatives in order of yield would be: cotton after gram, cotton after fallow, cotton after *guara*, cotton after *taramira* and cotton after wheat.

Whatever the previous crop, two irrigations are necessary to start with. The advantage of these is that the crop can stand the heat of June-July even without any further irrigation for some time.

After the first irrigation, two ploughings should be given; then the second irrigation and another two ploughings. An equal number of *sohagas* is also necessary. Farmyard manure at four cartloads per acre should be worked into the field. More manure can be added, but that would depend on the fertility of the soil.

WHAT VARIETY

The yield would also depend on the variety used. The varieties *LSS*, *216F* and *320F* are well-known. *320F* has succeeded quite well on my farm at Amargarh in Sangrur district of the Punjab. This variety is particularly useful for farmers who want to take a wheat crop after cotton because it is early-maturing. *LSS* is a late variety. On *barani* lands, *216F* should be grown.

Usually, it is not advisable to sow wheat after cotton. It is better to grow berseem, *senji* or *guara*, or leave the land fallow.

A seed-rate of at least 1½ seers per *bigha* should be used. If all the seed germinates, the seedlings can later be thinned out. If you are late, use more seed, and if you are early, reduce it. Before sowing, soak the seed in water for five or six hours. Then rub the seed with sand, earth or cow-dung.

If cotton is to be raised after wheat, the land preparation should be commenced immediately after the harvesting of wheat. If you want to reap a good cotton yield, sow cotton as soon as possible thereafter, even if you have to postpone the threshing of wheat for a few days. The best time for sowing cotton would be from the second half of April to the first half of May.

SOW IN LINES

If your soil is quite fertile and you also manured it well for the previous crop, sow cotton with a drill in lines 3 to 3½ feet apart; otherwise, keep the distance 2½ feet. Always sow in straight lines so that the ploughing with the *triphali* later would not harm the plants. I keep the lines straight with the help of a rope. Never work the *sohaga* after sowing cotton, as it would affect the germination of the seed adversely. Cotton should always be sown in the evening and never in the morning.

The first irrigation would depend on the condition of the crop and your own judgment. It should preferably be given after a month or 1½ months of sowing; the longer the first irrigation is delayed, the better it is. However, while irrigation can be neglected in the preflowering stage, the land should not be allowed to dry once the flowering has started. On this would depend the ultimate yield.

About ten days after sowing, the crop should be bar-harrowed lengthwise. It should be again bar-harrowed after another 20 days, this time breadthwise. Thereafter, two ploughings may be given with the *triphali*: the first after a month, and another 15 days after that. The *triphali* must be worked at least four times.

When bolls start forming, the ploughing with the *triphali* should be stopped. Otherwise, the bolls would shed. Better take up the *khurpa* thereafter, but this is usually very costly to the farmer. If the land has been prepared well in the initial stage, this operation can be easily done away with.

TWO THINNINGS

The cotton crop should be thinned twice: first, a month after sowing and then, after another 15 days. The plants should stand at one foot to 1½ feet.

If the crop appears to be pale, ammonium sulphate may be applied in the first week of August. The ammonium sulphate should be given at ten to 15 seers per *bigha* in two equal doses with an interval of 15 days.

The fertilizer may be applied in the irrigation channel where well

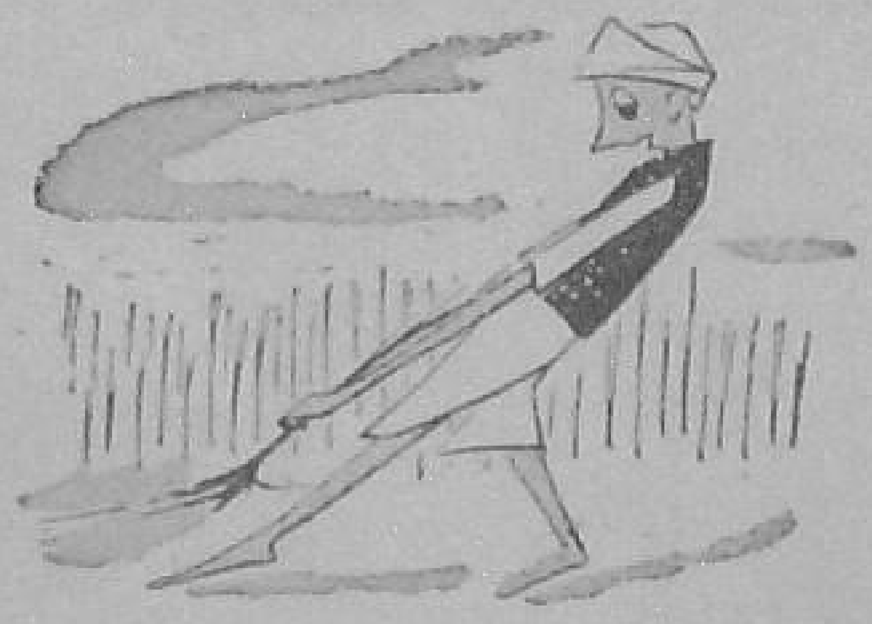
CONTD. ON PAGE 31

WHAT'S NEW IN FARMING

ROGUING CROPS

MANY farmers do not realize that the small inconvenience of pulling out undesirable plants from their fields and thereby a small loss of yield this year, pays well in the coming years.

If they want an improved variety to yield well, the first condition is that they keep it pure. If the seeds get mixed up, the crop would not ripen uniformly and the yield and quality of the produce would also go down. Hence, the produce will fetch a lower price.



Farmers should, therefore, see that no inferior varieties or diseased plants grow along with the improved variety. This they can ensure by "roguing" the crop, which means removing undesirable plants from the field before harvesting. Only then can they keep the crop healthy and pure.

Farmers should rogue out all diseased plants and burn them, and also remove admixtures of any kind. While harvesting a crop, they should also make sure that they do not mix up different varieties. They should thresh each variety separately and store the seed after drying in clean and disinfected containers.

A NEW LINSEED

A NEW variety of linseed, named *T. 126*, has been selected for the north-eastern districts of Uttar Pradesh.

In trials conducted at Bahraich from 1954-55 to 1956-57, the new variety has given about ten per cent more yield than the previously recommended *Type 477*, and about 40 per cent more than the local. In yield tests in different regions all over Uttar Pradesh, the increase in the yield of *T. 126* over the local ranged very high. Though it has yielded as high as 1,584 pounds per acre, the average yield is 800 pounds. The oil content is about 41·4 per cent.

Besides, the new variety is rust-resistant, early-maturing (140 to 145 days) and bold-seeded (102 seeds per gram), while *T. 477* and the local varieties are late-maturing, highly susceptible to rust and small-seeded (175 and even more seeds per gram).

Type 126 will meet the long-felt need for a suitable variety for this important alluvial linseed-growing region of Uttar Pradesh, which accounts for 48·0 per cent of the total linseed acreage in the State.

NITROGEN APPLICATION TO SUGARCANE

HIGHER cane yields and good jaggery quality have been recorded at the Sugarcane Research Station, Anakapalle, by completing the total nitrogen application to the crop within 4½ months—half the dose at 1½ months and the other half, three months thereafter. Fertilization within three months was noticed to record a slightly better juice quality.

The tests were conducted with the sugarcane variety *Co. 419*. It was given a topdressing of a 100 pounds nitrogen as ammonium sulphate at different stages of growth between 1½ and six months of planting. The crop was harvested at 12 months.

RESISTANT FLIES

In many areas, flies have become resistant to the insecticides commonly used.

Before you come to any conclusions regarding the programme you are now working with, be sure you are using the chemical in the concentration and quantity recommended by the manufacturer. A weak spray or a thin application will not do the job!—*Pacific Poultryman*

* * *

RECKON UP FOR YOURSELF

Here are points which answer the question "Should I keep my pullets a second year?"

Advantages

(1) Hens lay larger eggs, which sell for higher prices.

(2) Depreciation per bird is spread over a longer period of time.

Disadvantages

(1) Old hens lay 20 to 30 per cent fewer eggs.

(2) During a six to eight-week moult a hen will eat 15 pounds of feed.

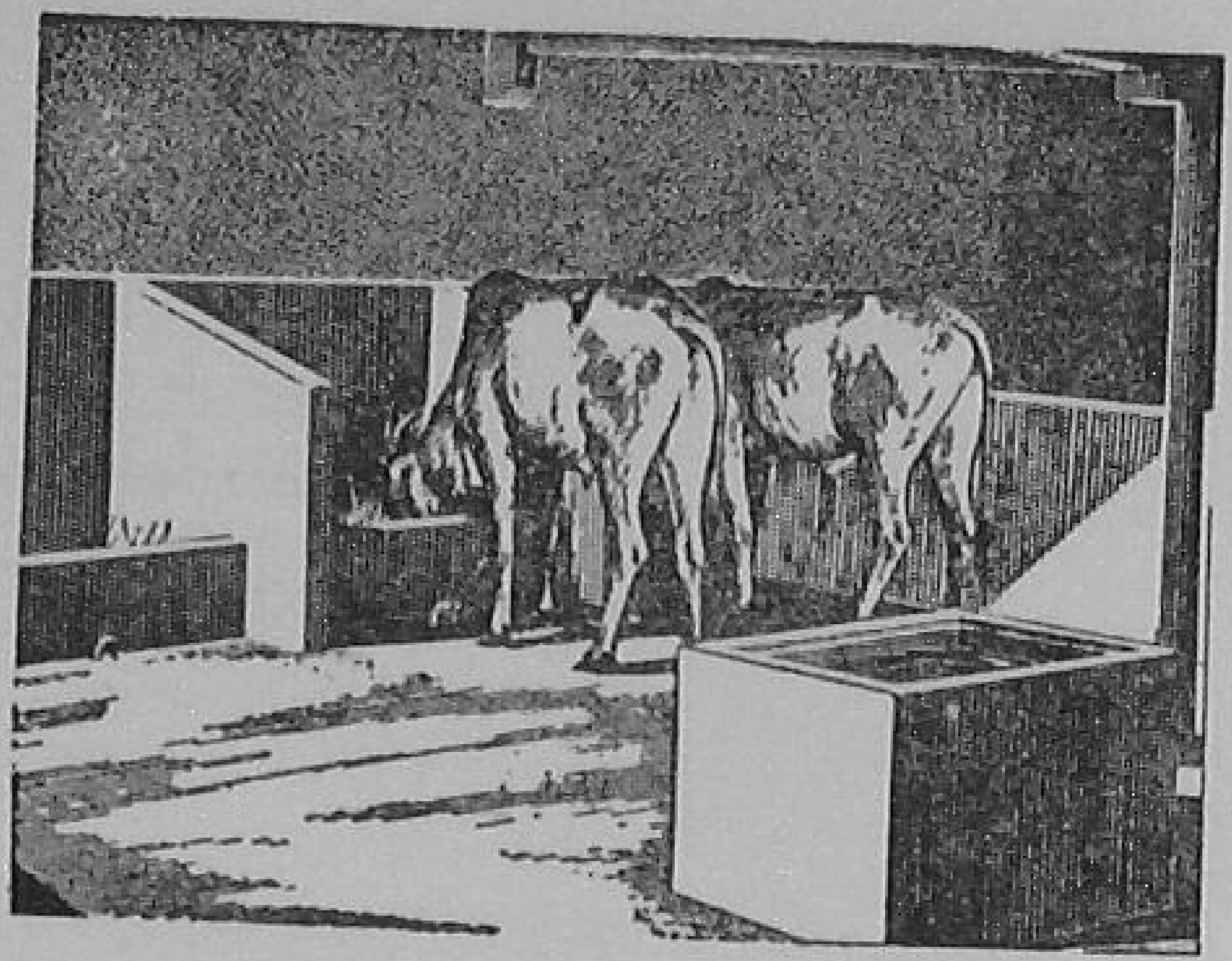
(3) Mortality is usually higher.

(4) Egg quality is lower.

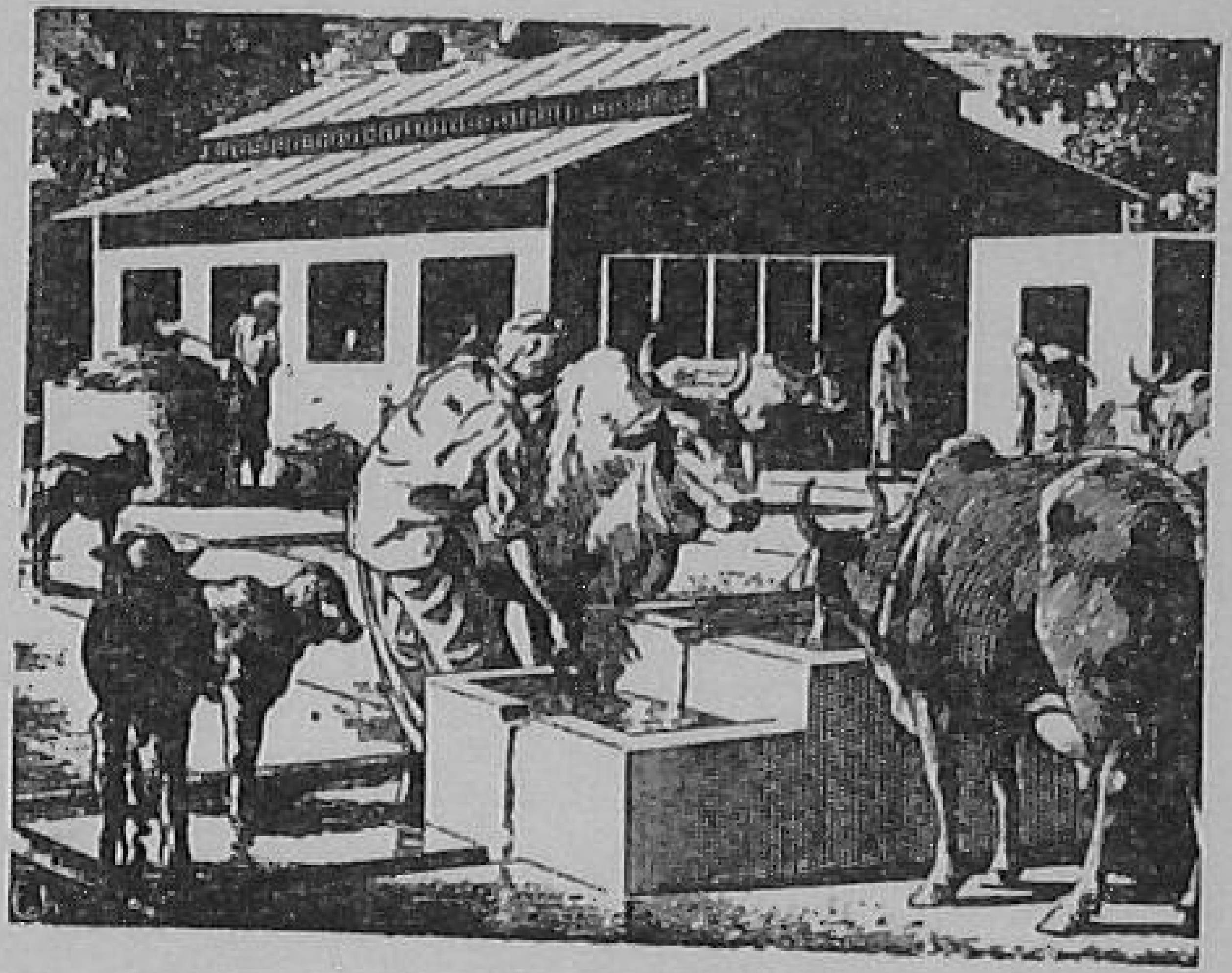
(5) Feed costs per dozen eggs are higher.

Conclusion

Profits in holding over pullets vary from year to year depending on seasonal egg prices. Keep the cream of the flock—those that are heavy layers—in good health.
—*G. L. F. Egg Business*



◀ a manger



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farm flashes

Berseem fertilized with 3⅛ maunds of triple superphosphate per acre has been seen to yield an extra 102 pounds of green fodder per pound of phosphoric acid applied ; *methra* gives about 54 pounds extra and *senji* about 52 pounds extra.

The quality of fodder also improves.

In the Punjab, treating groundnut seed with "Ceresan" before sowing, spacing the crop properly and application of ammonium sulphate have been found to increase yield from about 11 maunds of pods to 32 maunds of pods per acre.

Ammonium chloride is as good as ammonium sulphate for most crops like paddy, maize, sugarcane, cotton and *jowar*. It contains 26 per cent nitrogen as against 20 per cent in ammonium sulphate. It is specially suited for water-logged soils.

Potato varieties like *Uptodate* (Simla *Numbri*), *Furore* and *Craig's Defiance* respond more to potassic fertilizers than do the indigenous varieties such as *Phulwa* and *Darjeeling Red Round*. A dressing of three to four maunds per acre of sulphate of potash applied in furrows before planting is the normal dose.

Capsularis jute as an earlier additional crop can be fitted well in a double cropping programme with transplanted paddy. About 11 maunds of jute fibre can be obtained from the same land by growing it only for 90 days. The slight reduction in the paddy yield (second crop) can be more than made up by manuring the paddy crop.

White grubs of cockchafer beetles appearing in the soil in coconut gardens after a few showers can be effectively controlled by drenching the affected soil with spray fluids of BHC, or incorporating BHC five per cent or "Chlordane" five per cent dust into soil.

Wherever mastitis is present in dairy cattle, losses can be minimized by simple hygienic measures. The affected animals should be isolated and milked by a separate *gwala* or, at least, milked last. The udder and teats should be cleaned with three per cent "Dettol" before milking and dried with cloth, using a separate cloth for each cow. The milker should wash his hands with soap and water, and next with a disinfectant ; the process should be repeated before milking the next cow. The teats should not be left in a wet condition.

Feeding of fresh goat-blood to poultry at the rate of an ounce per pound per day has been found to increase egg production by at least ten per cent. Similarly, *lassi* at ten pounds per hundred birds makes chicks grow faster and better ; when given to adults, it increases egg production by at least seven per cent.

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This paddy crop shows that soil conservation is paying dividends to farmer Nadar

ONE IMPROVEMENT, A 1,000 RUPEES MORE

HOW one single improvement on his farm, bunding of the fields, has added another thousand rupees to his income was revealed to me by farmer Nataraja Nadar whom I met some time back. Shri Nadar belongs to Mathamapalayam, Bilichi village of the Perianaikanpalayam N.E.S. Block in Coimbatore taluk of Madras State. He cultivates 12 acres of land, of which eight are dry and four irrigated by a well.

Hitherto his cropping pattern had been: 0.42 acre under summer paddy, 0.60 acre under the main paddy crop (between July and December), one acre under *MCU 1* cotton, one acre under tomatoes and the remaining four acres under *cholam* followed by *ragi*. The dry cropping comprised two acres under groundnut and two acres each under *jowar*, *varagu* and horse-gram.

Now it is: turmeric on half an acre, vegetables on half an acre, tomatoes on one acre, *MCU 1* cotton on one acre, *bajra* and *jowar* on half an acre each, and a double crop of paddy on 1½ acres.

His per-acre paddy yield has increased from 2,500 to 5,000 pounds, "because now the rain water does not run off and wash away the topsoil, but soaks into the ground. This keeps the water level in my well also at six feet instead of three feet of before," he said, "and I get extra water to raise more and better crops."

Of course, he still sticks to his old manuring schedule which is fairly heavy: a 100 cartloads of tank-silt once in four years, and 4,500 heads of sheep, 60 cartloads of cattle manure and 224 pounds of ammonium sulphate plus a thousand pounds of bone sinews every year. After the harvest of the second crop of paddy, he green-manures the field with sannhemp.

Even his dry crops have started yielding more to the extent of Rs. 200. This too he confidently ascribes to the bunding of the fields, "for more moisture is now available to them," he says.

—M.J.D.

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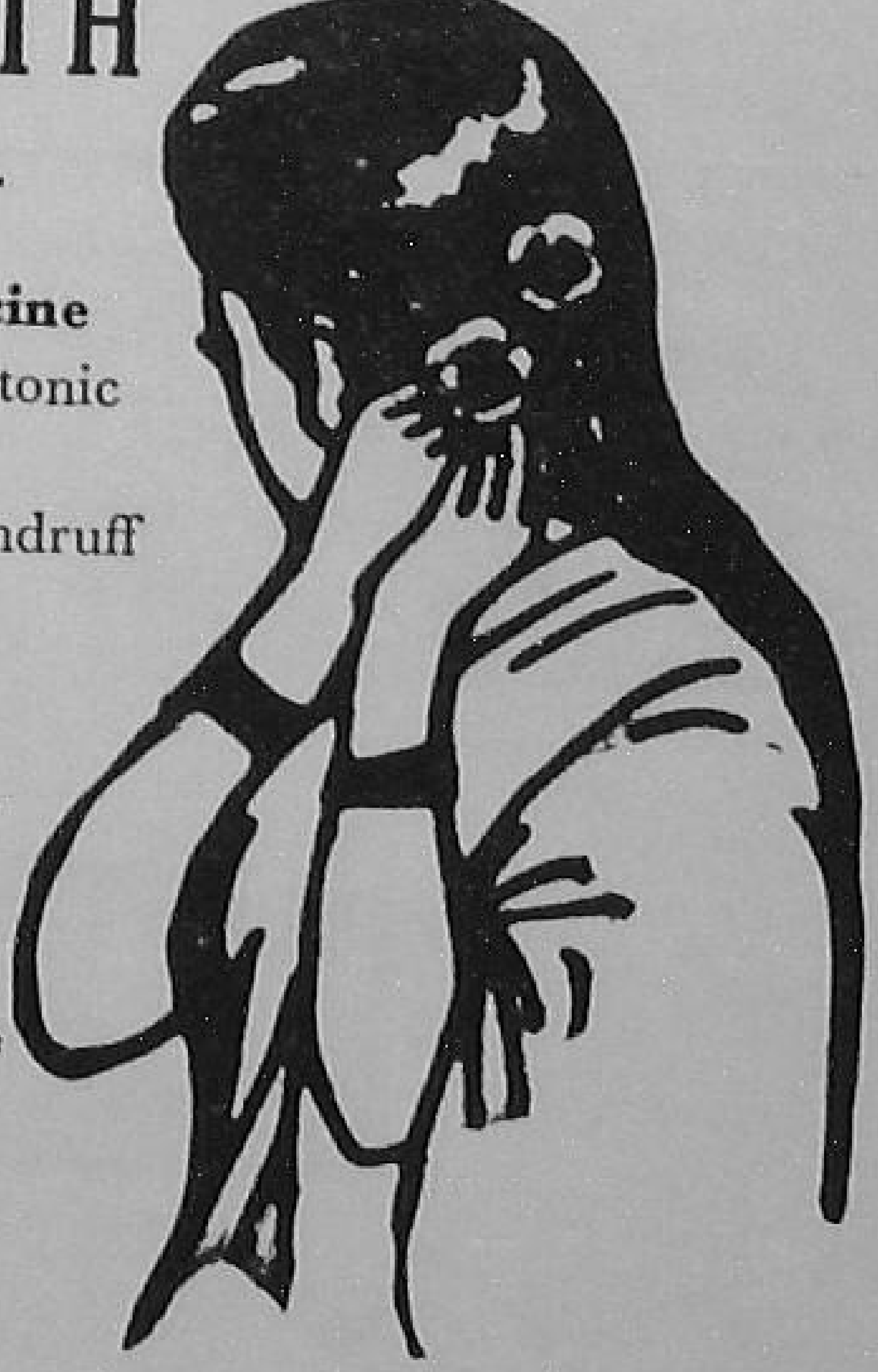

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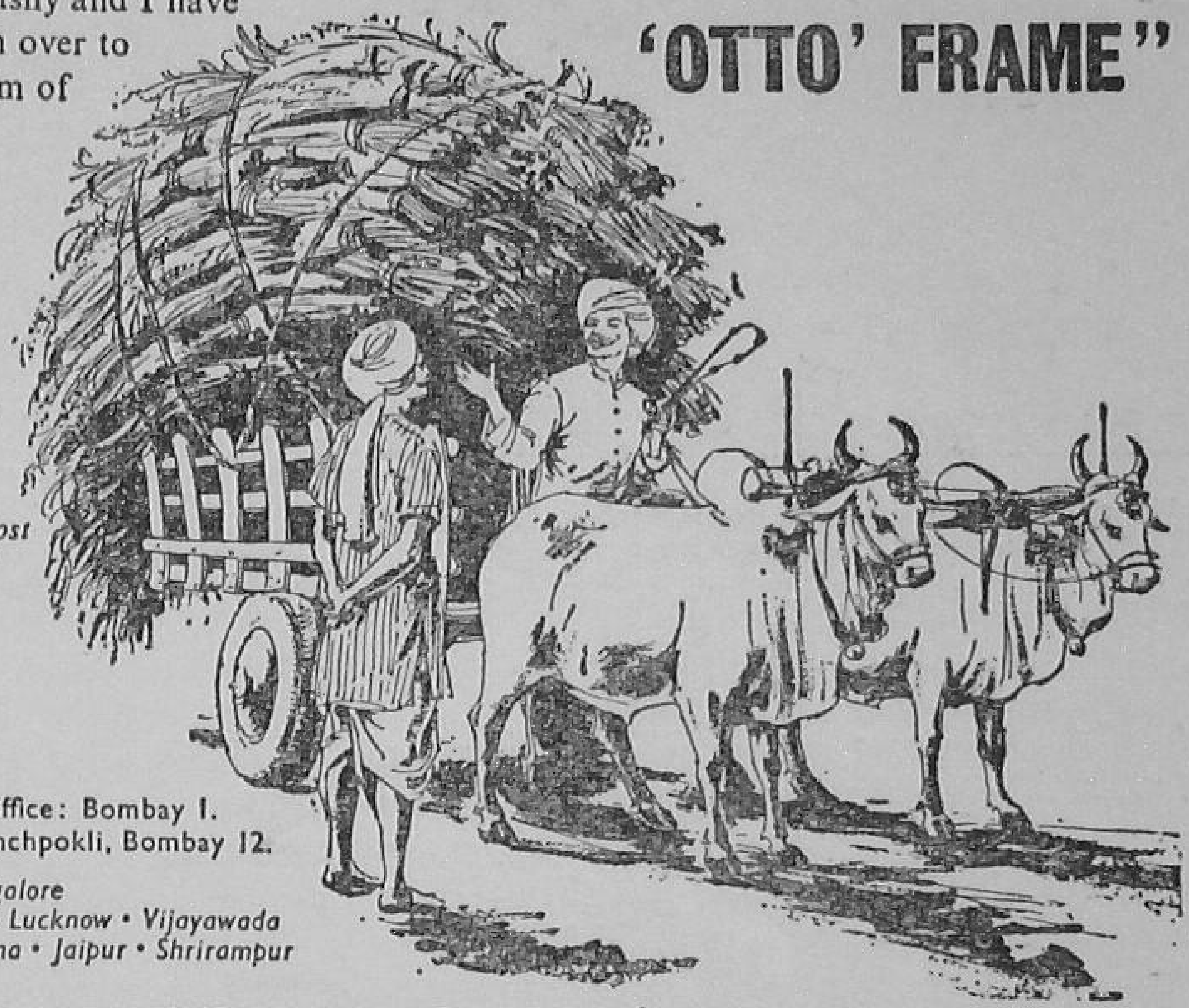

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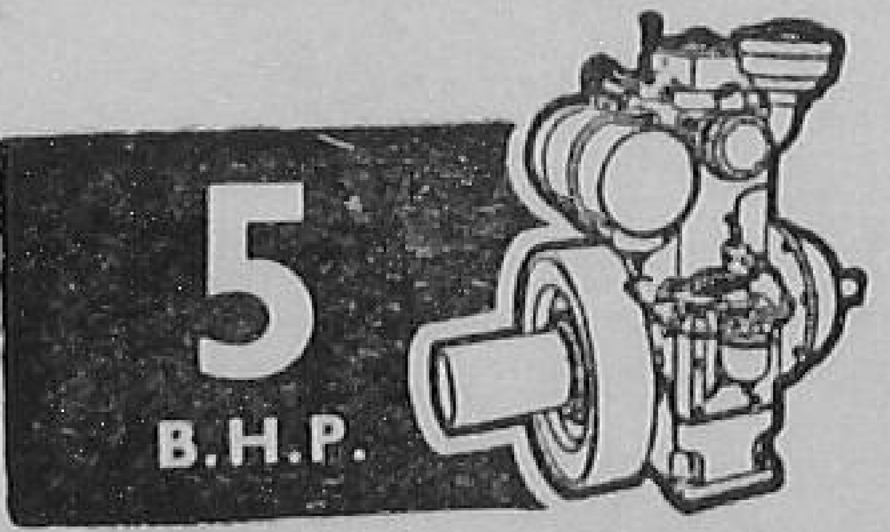

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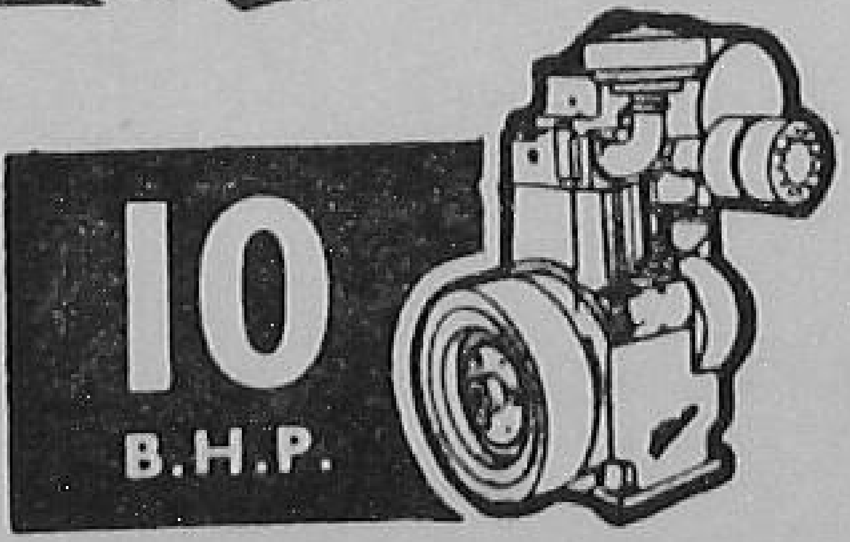

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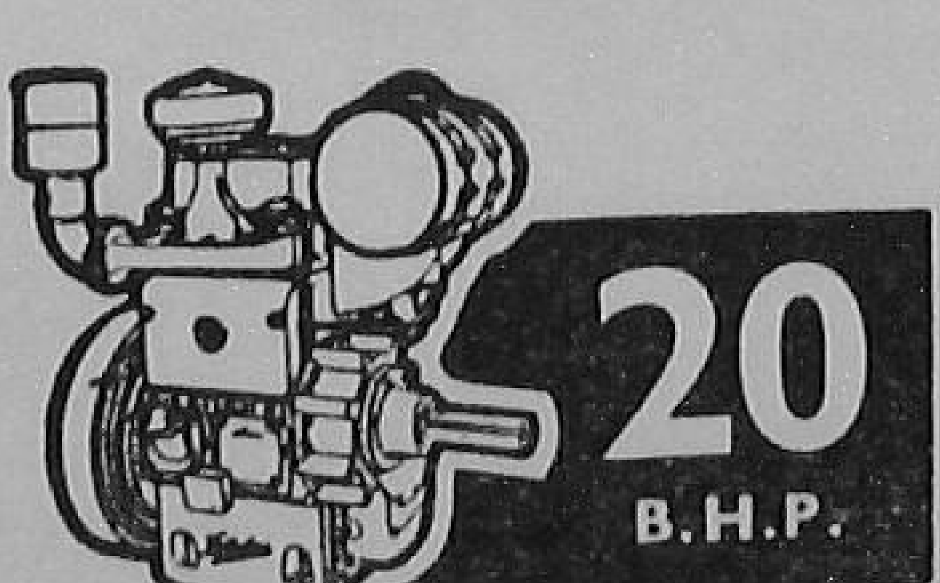

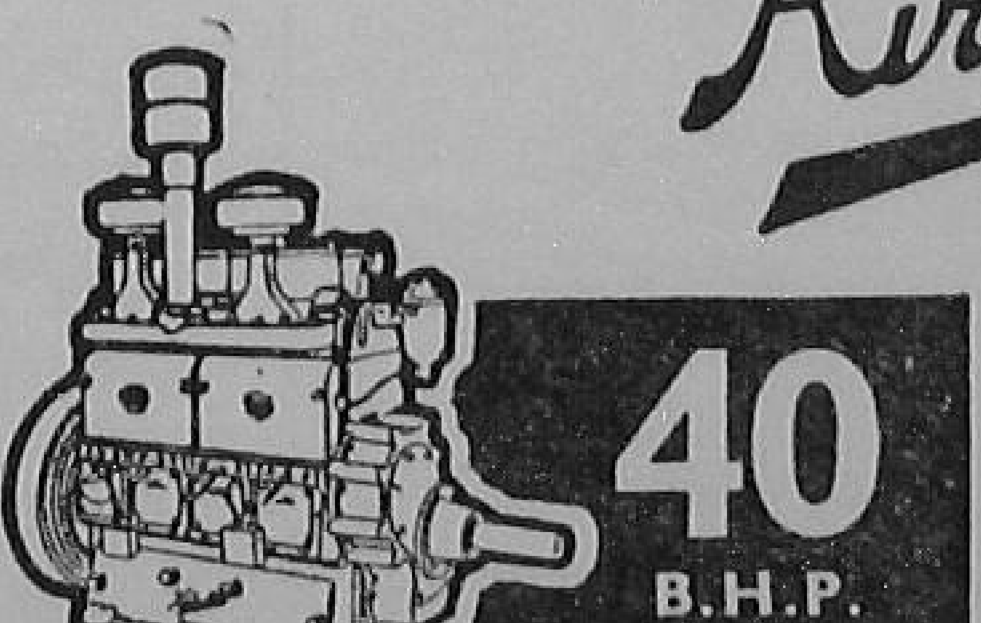

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Better Implements For Farmers

With a view to effecting improvements in indigenous agricultural implements, a survey was sponsored by the Indian Council of Agricultural Research in 1954, and as many as 552 implements collected from various parts of the country tested at the Indian Agricultural Research Institute, New Delhi. These included: 192 ploughs, 87 harrows, 83 hoes, a 100 seed-drills, 14 planks and levellers, 40 rollers, 11 ridgers and 25 sickles. Simultaneously, efforts have also been made to introduce suitable implements from other countries, and to develop new machines.

The survey revealed that a wide variety of ploughs was used in the country, because the farmers made modifications in the shape and design of the plough to suit their own conditions of cultivation. As regards the harrows, their number was found to be very large in the former Hyderabad and Bombay States only. Similar was the case with hoes and seed-drills. The variation in seed-drills was particularly large in Madhya Pradesh. Sickles, levellers, rollers and ridgers did not differ much.

JAPANESE IMPLEMENTS

In 1950-51, a set of improved Japanese implements and machines was obtained from Japan. Of these, the pedal-operated paddy thresher and the rice-land weeder have been found very useful and are being used by farmers in several parts of the country. Various manufacturers have taken up their manufacture with certain modifications to suit our conditions. The Japanese weeder has been very considerably modified at the Agricultural Research Station, Karjat, and the new model has been given out on a very extensive scale through the Bombay Department of Agriculture.

Of the indigenous implements surveyed and the imported ones, the following have been found very suitable for adoption by farmers:

For paddy	Rice-land weeder
	Wet-land puddler
	Duck-foot Orissa plough
	Pedal-operated paddy thresher
For wheat	"Olpad" thresher
	Guntaka (hoe)
	Power thresher (Punjab thresher)
	Bund former
For cotton	Cotton seed-drill
For processing	Hand-operated paddy sheller
	Rice huller
	Rice polisher
	Groundnut decorticator

The drawings of these implements are supplied by the Division of Agricultural Engineering of the Institute to various concerns for their manufacture on a large scale.

MORE FROM ABROAD

Another 46 types of implements used in the U.S.A. and various European countries, and which are superior to our indigenous implements in certain respects, have recently been received through the FAO and their testing is in progress. They are:

Ploughs	4
Cultivators	20
Fork	1
Spades	2
Pulverizers	2
Seeders	2
Fertilizer placement machine	1
Mower	1
Scythes and attachments	8
Groundnut decorticator	1
Maize sheller	1
Chaff cutter	1
Hammers	2

Most of the implements and machines collected from within the country and imported from abroad are now on display in the Agricultural Museum of the Institute for the benefit of visiting farmers. All the required information pertaining to these implements is made available to interested parties on request.

NEW MACHINES

Research on the development of new machines was taken in hand in 1952. Machines which have already been developed are: rotary compost or manure screen, groundnut decorticator, jute seed-drill, groundnut planter and winnowing fan.

The blueprints of these machines have been supplied to various concerns so that they can manufacture them on a large scale. Besides, development work on the various implements which are likely to be of use to farmers is in progress. The implements being tested and developed are: improved *argadha* seed-drill, fertilizer placement-*cum*-sowing machine, bullock-operated seed-drill, standardized mould-board ploughs, bullock gear, single-bullock hitch, appliances and devices for using cow-dung gas and a small H.P. engine for use with cow-dung gas.

LET OUR INFORMATION SERVICE SOLVE YOUR PROBLEMS

The Publications Division of the Indian Council of Agricultural Research has issued a large number of publications for the benefit of farmers. These publications contain information on a wide variety of agricultural subjects and are being utilized by the agriculturists. Why not you too obtain copies?

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The *Ber* in India	25
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The work on these implements is in an advanced stage. The development of a small H.P. engine for use with a gas plant to run on cow-dung gas will be a great advance on the work so far conducted anywhere. The preliminary research shows much promise. Some of these projects are of fundamental nature, such as standardization of mould-board ploughs. They require the study of mechanics of the soil and the geometry of the mould-boards to fabricate mould-board ploughs for soils containing different amounts of clay and sand as their physical constituents.

In India, the use of fertilizers is becoming very popular. Most farmers broadcast the fertilizer and do not "place" it properly in the vicinity of the seed for maximum advantage. For this purpose, a fertilizer placement-*cum*-sowing machine is being developed. Various models of this machine are available in foreign countries, but their cost is very high and they require a large amount of power. It is, therefore, essential to develop a simpler but very effective machine to suit Indian conditions.

The implements of which the manufacture has been taken up on a very large scale in the country are: fodder-cutters, seed-drills, cane-crushing mills, mould-board ploughs, iron Persian wheel with a system of ball-bearings, "Olpad" thresher, the Japanese weeder, *triphali* (three-tined hoe), and hand-winnowers.

Under the Second Five Year Plan, implement stores and workshops are being set up in all the Development Blocks where improved implements would be stocked and repaired. The farmers have already started taking advantage of them. As time elapses, more and more of these facilities will be available to the farmers of the country.

CONTD. FROM PAGE 23

THE FARMER'S POINT OF VIEW

irrigation is done. It should be placed near the roots of the plants where canal or tubewell irrigation is available, taking care that the fertilizer does not fall on the leaves. The fertilizer should be mixed with an equal quantity of earth ; it would be ideal if earth constantly trodden by cattle in the barn is obtained.

The crop has also to be saved from pests and diseases. The spotted bollworm, the leaf-roller and the pink bollworm can be controlled by dusting the crop with five per cent BHC, and *tela* by spraying DDT one *chhatak* in $1\frac{1}{2}$ maunds of water.

"A PRECIOUS GIFT FOR MY WIFE"

For years I had been striving to save, but the meagre profits from my crops made it hardly possible. Year after year, harvests were poor for lack of abundant water. Then it happened suddenly. I managed to get a Cooper horizontal diesel engine and pump through the Government Taccavi Loan. Now there is abundant water and my crops have multiplied threefold. I have money to put by for the future. At last my dream of building up savings against the future has become a reality. My wife has called it the best gift I could give her.

CE 58 9 EVEREST

What SOIL CONSERVATION EDUCATION *Should Aim At*

by

John Blackmore

Land Use and Conservation Specialist
Agriculture Division of the FAO

THE great clouds of dust blowing East from Texas or Colorado wheat fields, the network of gullies that devour farms in India, the masses of soil materials torn loose by pounding rains on overgrazed range lands in Yugoslavia or Africa. These are in large part the work of man—of rural man.

Over a very large part of the earth's surface where man lives, erosion problems are serious. Why do rural people permit this erosion which destroys the very foundation of their lives ? Why do so many people, in spite of the educational and technical efforts of their governments, take no action to control the erosion of their soils ? Why are the human problems in soil conservation proving to be so formidable ?

Ignorance is a basic problem. It is, unfortunately, possible for people to live on an eroding landscape and be almost unaware of it. Even very heavy rates of soil loss are sometimes accepted as a normal background for daily living. It is sometimes the case that rural people are aware of the erosion, but accept it as inevitable, worrying about it but not knowing what practical steps to take to control it. In these uncomplicated situations the role of the technician/educator is quite clear. It is to bring awareness of the problem and its significance and to teach techniques of erosion control.

Only a few erosion problems are so simple as this, yet many educational programmes seem to have assumed this sort of simplicity. A great deal of the educational efforts that have been made at soil conservation seem to be based on the idea that if rural people knew the techniques for erosion control they would apply them. Experience in many places suggests that technical knowledge is not enough. Some people have put into practice the new knowledge brought to them, others have continued to live as before with erosion unabated.

DIFFICULT PROBLEM

Many conservationists now recognize that their most difficult problem is the rural man who is aware of the erosion of his land, has access to technical information on erosion control, but still does nothing about his problem. The conservationist must equip himself not only with technical knowledge of soil management, he must also know some of the fundamental aspects of human behaviour.

Rural man, like other men, uses a chain of ends and means. Most things of importance to man are ends, or objectives in themselves, and in addition are also means for attaining still other ends. A farmer wants a larger harvest. This, in turn, makes possible a desired income which is a means by which still other desires are satisfied. People place higher values on some things as ends than they do on others. Unfortunately, the conservation of the soil is not often a very important end for many rural people. Disagreeable as this may be to conservationists, it must be recognized. Moreover, if we are to succeed with soil conservation, we must begin by accepting the framework of means and ends of land-using people as our starting point. We must begin with things of real concern to rural man. One of these, of universal importance, is the matter of providing a living. Altogether too many people in this world are still at the very edge of chronic hunger, still more people may have almost enough to eat, but lack nearly all the amenities of life such as decent housing, clothing, medical care and education. Where these are the major ends sought by rural people, soil

conservation cannot successfully compete for scarce means. It must itself prove to be a means to the more desired ends.

MOST SUCCESSFUL

In practical terms this means that the set of land-use practices recommended for soil conservation must not result in a diminished production for use or for sale, but preferably should give an expansion of such output. It is for this reason that the use of fertilizers is often a most successful soil conservation practice. It is for this reason too that land users will first devote their energies and scarce capital to the development of their most productive lands, leaving for the last the control of erosion on badly mutilated and potentially least productive sites. Rural man tends to be less concerned with the conservation needs of his land than with the basic human needs of his family. He will provide for the needs of his land when by doing so he can attain a more ultimate personal objective.

There are many cases, as for example in the catchment areas of important streams, where soil erosion is not controlled because the private objectives of land users and the objectives of the society or community are in conflict. The society may seek to control soil erosion because of its bad effects in terms of the behaviour of the stream such as flooding and siltation. On the other hand, the land users on the water-shed may feel that erosion control would involve private costs to them, not offset by any benefits. It is in such cases that the society must use subsidies. Subsidies are effective where their total costs are less than their benefits to the society and where they offset the sacrifices which individuals make in the public interest. Among the subsidies commonly used in soil conservation work are expenditures on research to find acceptable and effective means for erosion control, and payments for certain types of necessary installations such as gully control devices, establishment of grass seedings, forest plantations, or terracing.

NECESSARY COUNTERPART

A subsidy is not an alternative to education but it is sometimes a necessary counterpart to education. In situations where the private objectives of land users diverge from the soil conservation objectives of the society, a subsidy may be necessary to bring them together. A subsidy of some sort may give the individual land user the necessary incentive to seek new technological information useful in revising his system of land management.

The management process itself is the framework into which soil conservation education must be fitted. At the heart of the management process is the matter of decision making. Man is a decision maker. Important

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executives of government and of large business firms make decisions. Illiterate peasants make decisions too, and the decisions about land use that are made by millions of rural people in the course of their daily lives are the really strategic ones so far as soil conservation is concerned. The little decisions as to what crops to plant, which way the rows should run, how long animals should be left to graze and how many and what kind of animals should be kept—these are the decisions that determine whether soils will be conserved or wasted. Thus soil conservation education must encompass the acts of daily life of rural people. It cannot be a thing separate and apart.

Educational activities can be helpful in several ways in connection with the management of land. In the first place, it is often necessary to provide, through education, a basis for decision that traditional land-use practices could possibly be improved or superseded. Such a decision requires new knowledge of the improved land-management techniques and of their probable consequences. It should be emphasized that land users will decide to abandon old practices in favour of new ones only in the face of convincing evidence that by making the change some desired result is to be obtained. A decision on a change in land-use also involves consideration of a number of alternate possible actions. For example, it is not enough that a decision be made to use fertilizers on pasture lands ; decisions must be made as to what kind to use and as to the rate of application. Still other decisions are involved regarding time and method of application. Moreover, the decisions must be tailored to the particular situation on each farm.

RATIONAL LAND USE

The subtle differences between farms that influence land-use decisions pose a formidable problem for soil conservationists. Effective soil conservation education must include more than a set of universally applicable "prescriptions" as to land-use practices. At the same time, glacially slow progress is made by using the available soil conservationists to make land-use plans on a farm-by-farm basis. No country can look forward to having a staff of conservationists sufficiently large that every land user has a specialist standing at his elbow prescribing the details of every action to be taken. A main part of the conservation education job is to teach methods of rational land-use planning and, in addition, to provide technical information in a form that facilitates

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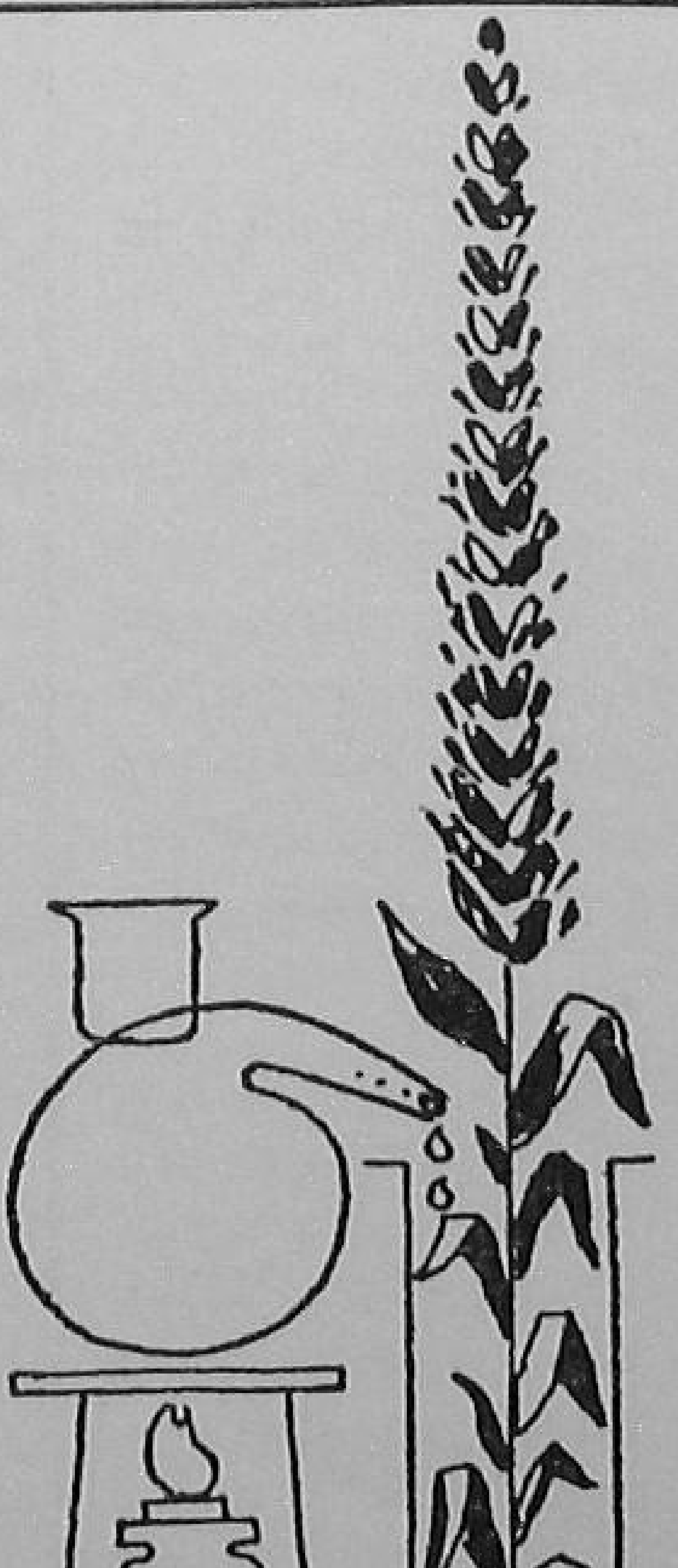

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the making of the particular land-use decisions that confront individual farmers.

The fragmentation of farms through inheritance or otherwise is a formidable barrier to the adoption of conservation farming methods. There are millions of fragmented farms scattered from Lisbon to Manila. The teaching of methods for their consolidation is a necessary part of the conservation education work.

OTHER FUNCTIONS

Conservation education has other functions related to problems of rural man. Over much of the world, cultivators, by reason of their tenure on the land, have no incentive to invest their labour or capital in the future productivity of the soil. Contractual relations of tenants with their landlords are often such that the benefits of tenants' investments go only to the land-owners and not to those who work the land. In other cases, the tenants' share of the production is only enough to provide for the most basic human needs, leaving nothing as savings for re-investment in the maintenance of the land's productivity. It is not uncommon also to find that customary tenure relationships are such that land-owners are reluctant to make such investments, feeling that the risks are too great. All around the world, an important part of the conservation education job is to teach both land-owners and cultivators methods for developing and using improved land tenure systems that provide incentives for both to make investments in land improvement.

Effective programmes of conservation education should serve more than rural man. In many countries important land-use decisions are made by absentee land-owners and often these are urban people. In addition, effective programmes should not overlook school-age children. School programmes should include instruction in technical skills and should also be directed to influencing basic attitudes on the conservation of the soil.

TWO OBJECTIVES

Soil conservation education for rural man should have these two objectives: to stimulate a desire for change in land-management practices, and to teach practical processes for planning land-use. For attaining these twin objectives, two educational devices have proved singularly effective when used with a system of farm advisors. One is the demonstration farm, and the other is the community organization. Used together, these make an effective educational combination. Practical, farmer-operated demonstration farms provide local experience with innovations in land management and other production practices. They have the dual advantage of providing observable results and of demonstrating the practicality of particular innovations when used as part of a whole-farm operation system. From such farms neighbouring farmers can learn not only how to install a system of terraces, but also how such a system fits in with such other farm practices as land tillage and crop harvesting. Probably even more important, neighbours can observe the economic consequences of the adoption of such innovations in terms of improved family living. Wives who see home improvements on demonstration farms become strong and effective advocates of systems of conservation farming.

COMMUNITY GROUPS

The first social grouping of rural people, above the family, is the neighbourhood or community group. Such groups are formed and held together by some common set of interests. In many cases, the joint problems of erosion and water control are a basis for group action at this level. The design of a system for disposing of surplus water from several farms, the consolidation of fragmented holdings, the stabilization of large gullies, the regulation of grazing on commonly held pasture lands, all these matters provide a base for group action. Conservation education on these problems can be made a main pillar in programmes of village, neighbourhood, or community action.

A community organization is a means for stimulating and mobilizing the local energy, and for magnifying the effectiveness of technical advisors. Demonstration farms can show what can be done, community organization provides the means for its accomplishments. The establishment of community goals for soil conservation, the designation of project committees for particular practices such as pasture establishment, terracing, fertilizer use, organization of training classes and farm tours, and some friendly competition between developing communities are all useful means for education in soil conservation.

Conservation education must bring more than technical information. It must bring to rural man new ideas on planning land use. It must also bring some stimulation of such primary social groupings as the community to serve as means for focussing the energies of rural people on their soil conservation problems. Conservation education must set out to widen rural man's range of choices as to land-use practices, and thus through his everyday decisions about land-use achieve an improved and permanent productivity of the soils upon which we all depend.

READERS WRITE

Silver From Sisal

The above article in the June, 1958 issue of "Indian Farming" gave me some valuable information on sisal. At present, I am cultivating sisal only as a fence for my mango grove. As a vast area of my land seems to suit sisal, I request you to kindly furnish me with full details about its cultivation and marketing.

—P. C. P. Radhakrishnan,
T. Palayam, Madalapet P. O.

The method of planting sisal (*Agave sisalana*) varies considerably according to conditions of soil and climate. In East Africa (Kenya and Tanganyika), sisal is cultivated on a large scale. It has been cultivated on an experimental scale in Assam, Bengal, Madras, Bombay and Mysore. It grows well in dry zones on well-drained soils, and is exceedingly drought-resistant.

There are two practical methods of propagating the plant : by bulbils and from suckers.

Bulbils are produced when the plant, after vegetating for a certain period (about ten years in India), makes the supreme reproductive effort which results in its death. The terminal bud from the centre of the plant begins to grow rapidly, forming a long flowering stem out of which emerge the lateral branches producing flowers in dense clusters. Before long, buds appear in the axils of the scale leaves just below the flowers, which rapidly wither away. From these buds arise small plants, known as bulbils, which grow a few inches in length, get detached and fall on the ground, where some of them take root. For cultivation, these bulbils are removed and planted, preferably in nurseries. About 2,000 bulbils are produced by one flowering stem.

After producing bulbils the whole plant withers up and dies. Suckers attached to the main plant at this time may throw out a central stalk to a height of three or four feet bearing diminutive flowers and bulbils. They will invariably do so if the pole of the parent plant is removed at an early stage. This stage in the life of the sisal plant—the "poling stage"—and the time of its occurrence are a matter of great concern to the practical planter, as upon it largely depends the arrangement of his planting programme. It may also prove a determining factor in respect of crop-yield, but the rate of leaf production must not be overlooked in this connection.

Suckers are produced from underground stems or rhizomes, which may be of some length, and thus new plants arise near the parent plant. Suckers constantly appear after the first year and develop in clusters round the parent plant.

Suckers are said to reach maturity about a year earlier than bulbils, but they also "pole" earlier. On the whole, plants raised from bulbils make better progress than those from suckers. Bulbils are more easily obtainable in large quantities. For this reason, they are frequently used for starting plantations.

According to some authors, bulbils are more dependable than suckers for obtaining new plants exactly similar to the parent plants. Previous to planting out in the field, the bulbils should be kept in nurseries for about one year, spaced out nine inches × 18 inches, to obtain optimum-size stock for planting.

Transplanting is easily and quickly done into small holes prepared in advance. Care is taken that the bulb is no more than partly covered with earth. Regarding spacing, there is much difference in opinion. Generally, the plants are planted six feet apart in eight feet apart rows, which gives 908 plants per acre. However, the spacing would depend on the fertility of the site. A closer spacing should be adopted on poorer sites.

Weed removal and soil-working are essential throughout the life of the plantation. These not only facilitate the cutting operations but make for very good growth and development of plants. All suckers developing during the first two years may be removed. Sisal should preferably be grown as a pure plantation, but cotton or other similar catch crops may be taken in the first few years.

The harvesting of leaves from the plant for fibre commences in the third or fourth year. The leaves extend laterally at right angles to the trunk, and the older ones are cut close to the trunk. The cutting of mature leaves should not be unduly delayed, or the quality and quantity of fibre would suffer.

Biannual cutting (January to September) of each plant should give an average 250 to 300 leaves during its lifetime of seven to eight years. The average weight of the sisal leaf is about two pounds, and a 1,000 leaves yield 60 to 80 pounds of dry fibre. Although the fibre content is as high as six to eight per cent, only three to four per cent is obtained by decortication.

Cateful planning is needed for the extraction of the fibre. The harvested leaves should be extracted immediately (within 24 hours). In East Africa, this is usually done by mechanical decorticators. In India, the leaves are either scraped by hand to remove the green matter from the fibrous layer or they are passed through a cane-crushing mill and then retted in water. The fibre becomes marketable after washing, drying, crushing and finally grading.

No Reason Why Ratoon Should Be Neglected

by

Kumar Nath Singh

Zonal Centre, Pachrukhi
Sugarcane Research Institute
Pusa

THE ratoon crop of sugarcane can yield as well as the plant crop, if given proper care. In three consecutive trials in Saran district of Bihar, I found that it yielded even better—by 23 per cent.

A one-fourth acre of land was selected and green manuring done with *sanai*. After a month of sowing *sanai*, a watch was kept over the formation of nodules by uprooting clumps at random once a week. It generally took 50 to 70 days for the maximum formation of nodules, when the crop was turned down with a soil-turning plough ; five maunds of green-leaf compost was applied at the time of ploughing in the *sanai*. Then, by the last week of September or the first week of October, the plot was thoroughly ploughed twice and *hengaed* well.

After the seed-bed was ready for planting, the furrows were opened, manure (castor cake one maund ten seers plus single superphosphate 20 seers) applied in the furrows and mixed well with a subsoiler. Then, healthy three-budded cane-setts from mother stalks only were planted. The setts were covered with a four-tined cultivator which was put through the furrows and finally *hengaed* twice. After a week, one more *henga* was given. One interculture in November, one in January and one in February were given to the crop. Towards the last week of March, one irrigation was given and again intercultivation done after a week. Towards the last week of April, the crop was irrigated for the second time and intercultured once again after a week. Then, by mid-May or May-end, the crop was earthed, and ten seers of ammonium sulphate applied. Finally, a furrow irrigation was given.

The plant cane was harvested during the second half of November. All mature millable canes were cut fairly close to the soil. Young post-monsoon tillers emerging from September onwards were left in the field for the second crop year, as these do not reach maturity at the time of the harvest of plant cane and thus bring the recovery down.

After the harvesting of the plant cane was complete, the soil of the ridge was stirred well with a *khurpa* to help aeration and extermination of weeds that grew between the plants. Also, hoeing was done with a spade.

PREMONSOON IRRIGATION

After the first hoeing of the ratoon cane, well-rotted manure (cattle dung plus 35 seers of castor cake plus farm waste previously well-decomposed in a pit) was supplied with five seers of single superphosphate (at $\frac{1}{2}$ maund to the acre) just near the plant roots. Both sides of the plant rows were carefully opened sufficiently deep by spade so as to make room for the manure. Then one irrigation was given. All these operations were completed by December.

The second hoeing was done between the last week of January and the first week of February. By the middle of February, one deep intercultivation was done, and between the end of February and early March, when the crop was one foot to two feet high, a dose of one maund and ten seers of castor cake (at five maunds to the acre) plus single superphosphate 15 seers (at $1\frac{1}{2}$ maunds to the acre) plus ammonium sulphate ten seers (at one maund to the acre) was applied. Then the crop was lightly earthed for the first time. Irrigation was given once again and two deep intercultures were done in furrows. By mid-April, one furrow irrigation was given with a deep intercultivation after a week's interval.

In mid-May, ten seers of ammonium sulphate (at one maund to the acre) were applied. Finally, the crop was earthed and irrigated for the last time.

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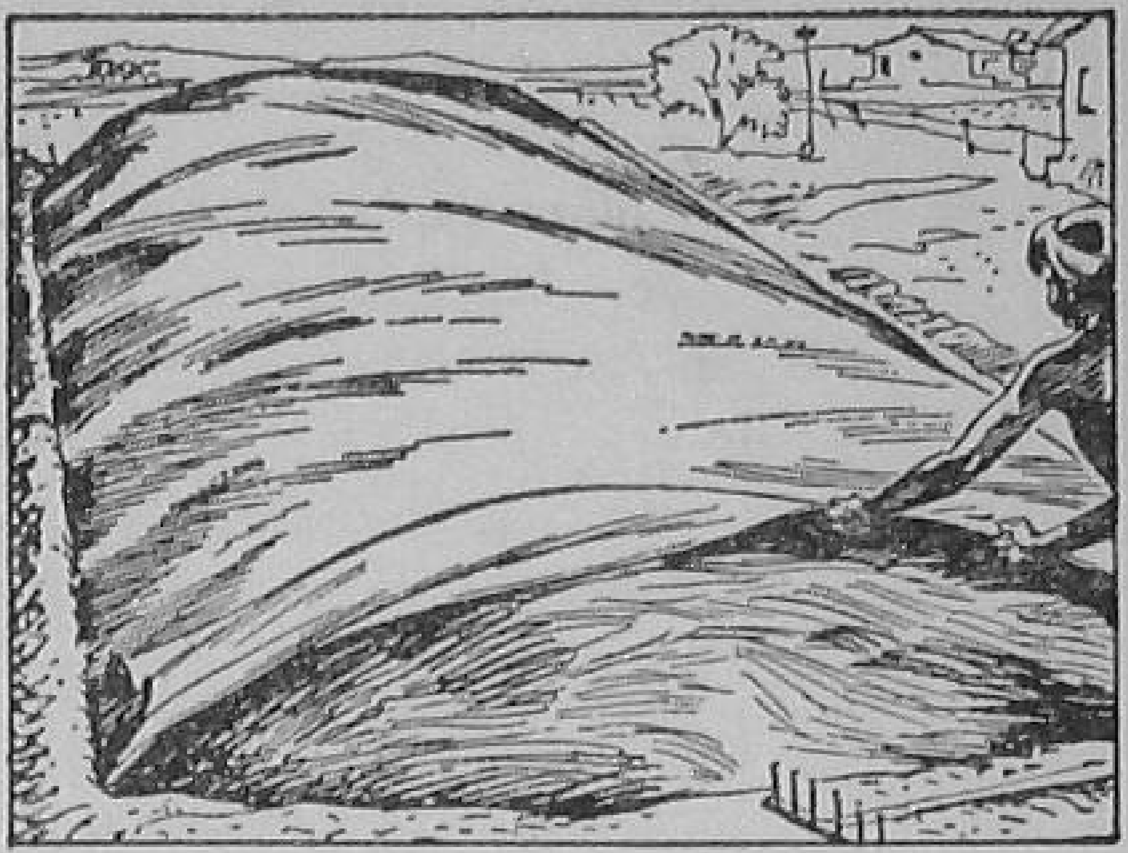

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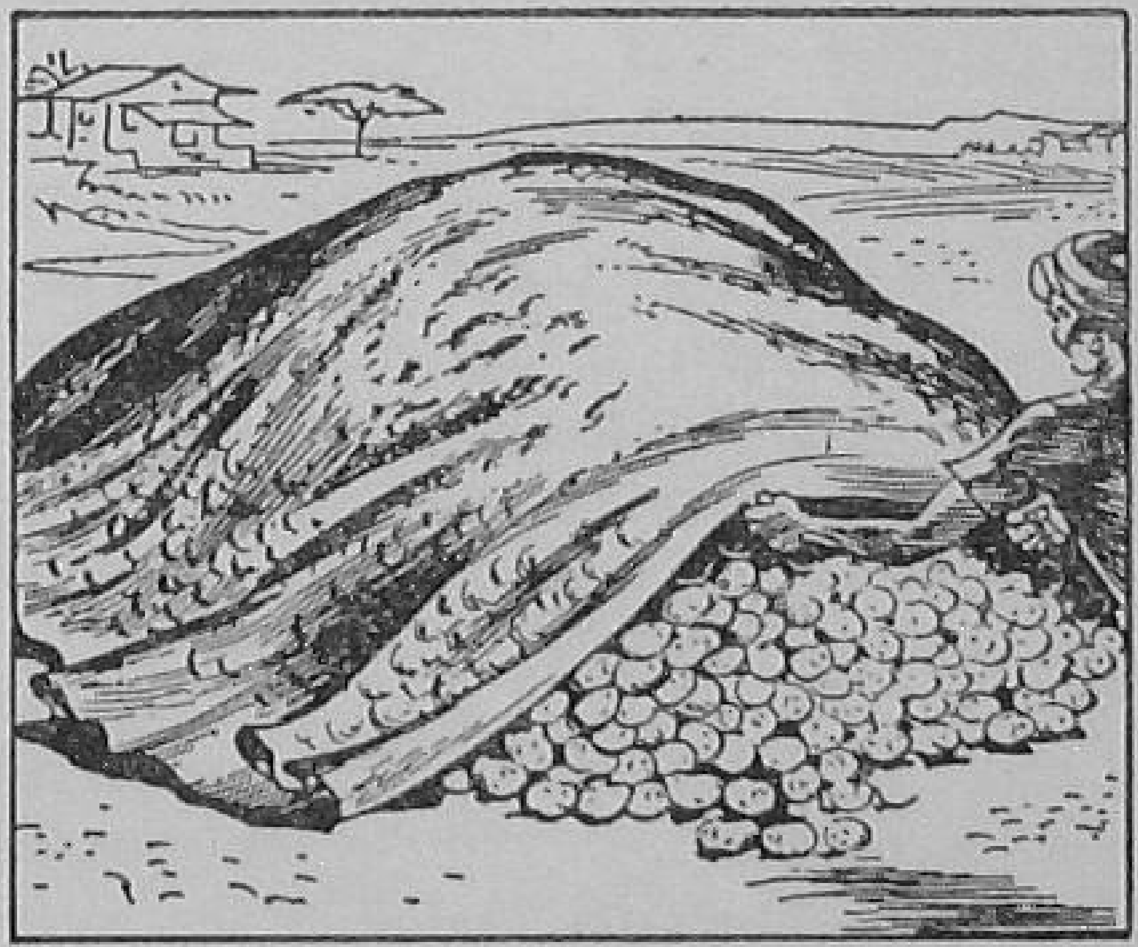

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In the month of October, the ratoon crop was ready for harvest. After the harvest of the ratoon crop, the field was given a deep ploughing and left fallow.

MANY ADVANTAGES

The ratoon plays an important role in the economy of sugarcane cultivation. It has the following advantages: (i) The expenditure on preparatory tillage, seed cane and planting is quite high for plant cane, but it can be reduced by distributing it over the plant and ratoon crops. (ii) There is no expenditure except on manures, interculturing and irrigation. (iii) More income is obtained from the same field. (iv) Valuable time during the busy planting season is saved. (v) The crushing period is prolonged and the sugar recovery is higher, if milled earlier. (vi) Having a ratoon rather than other cash crops after plant cane is always better.

Here are a few tips for getting a good ratoon crop:

Give proper attention to the plant cane which is intended to be ratooned, because gappy, poorly grown and diseased plants can never give a ratoon worth the name.

Select the seed cane carefully. The cane variety is the first thing to consider before planting for ratoon. While all varieties are not by character suitable for ratooning, some are heavy ratooners. Personally, I prefer *Co.513, B.O.22* and *B.O.29*. The seed cane must be healthy, mature and disease-free. If possible, only mother stalks should be used for seed purposes. Generally, 4,000 stalks are required for planting an acre and may easily be had from one-fourth acre of standing cane.

Just after the harvest of the plant cane, there is an acute shortage of soil moisture. So, a premonsoon irrigation is necessary for the ratoon crop.

Apply sufficient organic as well as inorganic manures, i.e., green manure (*sanai*), castor cake and green-leaf compost and ammonium sulphate and single superphosphate.

I prepared the green-leaf compost this way. Useless green leafy plants (*kalmidal*, etc.) found floating on the surface of many village tanks and ponds were collected. Green *neem* and *tulsi* leaves were added with a view to keeping insect pests away. *Shiso* leaves, *kalmidal*, castor leaves and mustard leaves, all in green condition, were put in the compost pit in alternate layers with cattle dung, ash and farm wastes. The compost thus got was applied at 20 maunds to the acre at the time of ploughing in the green manure crop. *Neem* leaves have germicidal and antiseptic effects. So, it may be wise to add some green leaves every year to the field at the time of cultivation or ploughing in of the green manure crop in the monsoon.

CONTD. FROM PAGE 16 **Farming Elsewhere**

potatoes and potatoes for industrial processing, sugar-beet, fodder-beet, pulse crops (chiefly green peas), flax and rapeseed.

Thanks to intensive tillage, a favourable climate, efficient water management and thorough fertilization, the yields obtained are among the highest in the world. In 1957, the average per-hectare harvests for the whole country were: wheat 3,967 kilograms (a kilogram = 2.2 pounds); rye 2,911 kilograms; barley 4,043 kilograms; oats 3,177 kilograms; potatoes 28,000 kilograms; and sugar-beet 42,000 kilograms.

Typical of Holland are the plant selection and breeding establishments, which supply a number of countries with seed grains, seed peas and beans, field crop seeds and seed potatoes.

The total area of grassland is 1,300,000 hectares, or 56 per cent of the available cultivable land. Part of the remaining 44 per cent is moreover utilized for the production of animal fodder and for poultry farming, so that about two-thirds of the cultivable land in Holland is directly or indirectly in the service of stock-breeding.

The grassland is distributed over the whole of Holland, with heavy concentrations in the fen peat region and the districts along the large rivers.

LARGE CATTLE POPULATION

The cattle population density is nearly 2.5 units per hectare, which is very high for a country in which hay has to be gathered during the summer for use in winter when the animals are stalled. The high density of the cattle population gives rise, on the one hand, to the necessity for increasing the production of grass by abundant fertilization and, on the other hand, to the large-scale consumption of supplementary feeding-stuffs. Since not all the required feeding-stuffs can be grown in Holland, large quantities of fodder grains are imported, not only for cattle but also for pigs and poultry. Stock-breeding in Holland might, therefore, be compared to a single great upgrading industry which imports raw materials and exports valuable end-products (milk, butter, cheese, meat and eggs).

Holland's milk production in 1957 was just over 5,827,000,000 litres (1,280,000,000 Imp. gal.) and the yield per cow 3,947 litres (868 Imp. gal.)—the highest in the world. The butterfat content of the milk, which has increased practically every year, is at present in the region of 3.75 per cent.

The large milk production and the high butterfat content are primarily the result of efficient selection of the breeding stock. There are two cattle herdbooks—one of which embraces three breeds—in which only the

best pedigree animals are registered. Only the very finest bulls may be used for breeding; they are frequently owned by the artificial insemination co-operatives.

Thanks to co-operation between the farmers and the Government the national herd is entirely free from tuberculosis and the foot-and-mouth disease.

Although in Holland cattle are kept mainly with a view to milk production, some 200,000 tons of meat are nevertheless produced every year.

The pigs kept in Holland belong mainly to two breeds, one of which provides export bacon and the other, meat for home consumption. The total production is about 350,000 tons per year.

The number of horses is decreasing year by year owing to the mechanization of agriculture. On the 294,000 farms, however, there are still 200,000 horses and foals, including some very fine pedigree animals.

Sheep are kept for the meat they provide; the sale of wool is merely a sideline.

Poultry farming has increased enormously. There are special hatcheries in which hundreds of thousands of eggs from selected birds are hatched every year. The young hens and the older ones together lay approximately 5,000 million eggs per year. The average yield per bird is 200 eggs annually. Ducks are kept both for egg production and for slaughter.

HORTICULTURE

Nearly 125,000 hectares of cultivable land (five per cent of the total) are in the service of Dutch horticulture.

Vegetable-growing is the most important branch; 47,000 hectares, of which 3,400 are under glass, are utilized for this purpose. The most widely grown crops, both for the home market and for export, are cabbage, lettuce, onions, tomatoes, carrots, runner-beans, French beans, gherkins, cauliflower, red and white cabbage, Brussels sprouts and asparagus. Most of the vegetables are grown in places where there is a great deal of peat in the ground, that is to say in the west of the country and the districts in which the low moor peat has been dug away. Recently, however, vegetables have also been grown in large quantities on the light marine-clay soils (clay with sand). The annual production for the market is over a million tons.

Fruit-growing is pursued mainly on the river-clay and marine-clay soils, but strawberries, red and black currants and raspberries are also cultivated on light sandy and peaty soils. The total area available is 60,000 hectares, of which 700 are under glass. The annual production for the market is between 350,000 and 400,000 tons; it consists chiefly of apples, pears, grapes, red and black currants, cherries, plums and strawberries.

The bulb-growing industry is concentrated mainly on the strip of light sandy soil behind the dunes. Every spring, the flowering bulbfields in this district are visited by hundreds of thousands of tourists. Only a small acreage (less than 9,000 hectares) is utilized for the cultivation of bulbs, but the yield has a high value. This value is expressed not only in terms of money but also in the fame that Holland has acquired through its bulbs.

Dutch cut-flowers and flowering plants can likewise be regarded as ambassadors of Holland. More than 500 million cut-flowers (mainly tulips, carnations, freesias and roses) and ten million potted plants are taken to the auctions every year. They are grown principally on the peat soil in the west of the country, the area in use for this purpose being 1,400 hectares, of which 450 are under glass.

Woody nursery stock is grown on the peat soil in the west of the country and on the sandy soil in the south and east. The area in use amounts to 2,700 hectares in the open and ten hectares under glass.

A further considerable acreage, totalling 5,500 hectares is utilized for the cultivation of fruit and vegetables for seed.

Dutch agricultural produce is for the most part distributed through markets, product exchanges and co-operative auction societies. Certain products (milk, sugar-beet, potatoes and straw) are also delivered direct to the processing factories.

The co-operative factories account for 70 per cent of industrial-milk processing, 80 per cent of potato-flour production, 65 per cent of sugar-beet processing, 65 per cent of strawboard production and 50 per cent of export bacon production.

For the sorting and storage of potatoes and fruit, numerous sorting establishments, storage depots and refrigerated warehouses have been built, some of which are run on a co-operative basis.

In 1957, Holland was the world's biggest exporter of potatoes (450,000 tons), potato flour (65,000 tons) eggs (2,700 million), bulbs (200 million guilders' worth; one Dutch guilder =£ 0.1.11) and strawboard (210,000 tons). In addition, Holland was the biggest exporter of condensed milk (230,000 tons), the second biggest of cheese (86,000 tons), the third biggest of powdered milk (36,000 tons), and the fourth biggest of butter (36,000 tons).

The strict control exercised by the Government over the quality of practically all agricultural export products sets a final seal on the work of the Dutch farmers, horticulturists and manufacturers.

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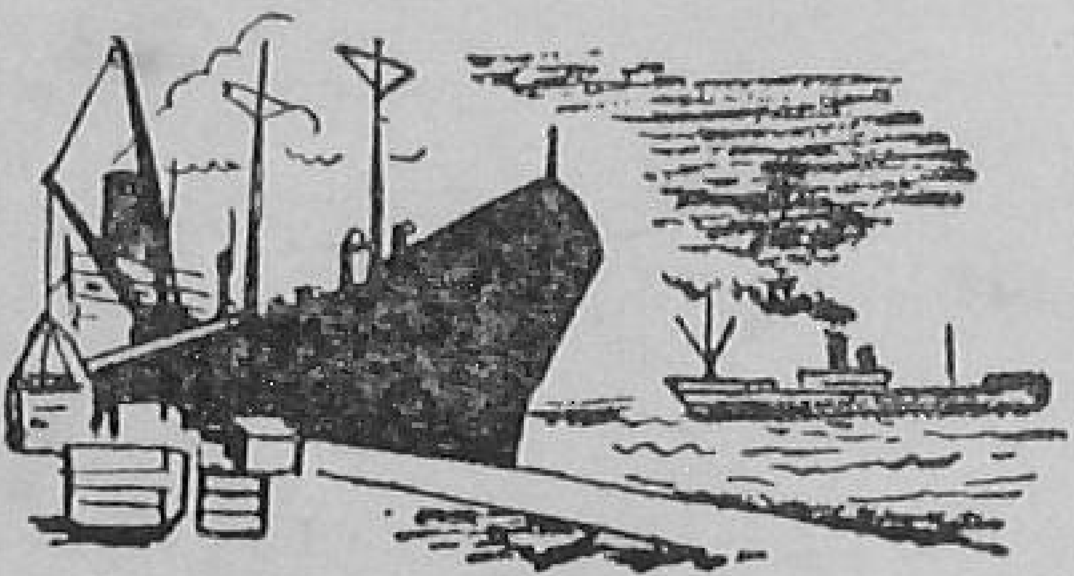

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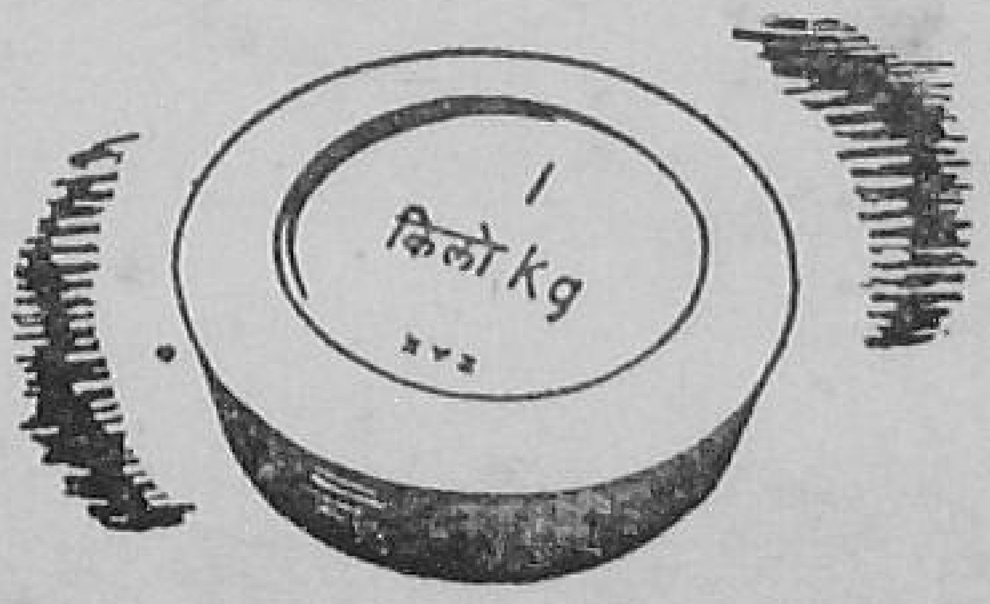

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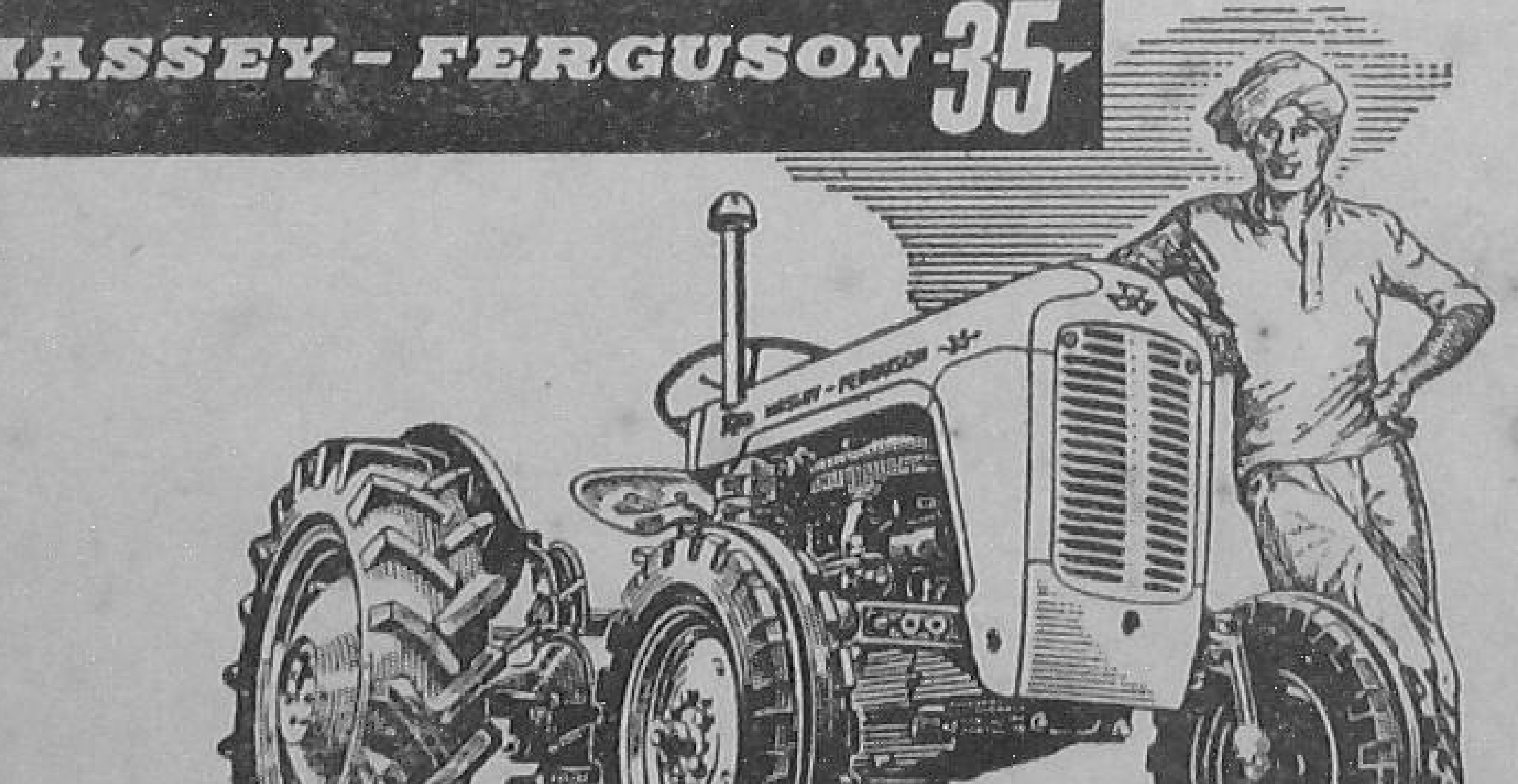

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